

March 1948

TECHNOLOGY REVIEW

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technology review

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Unlike today's other rising costs which may be compensated for by larger volume, eye accidents are out-and-out embezzlers of your profits. THEY CUT BACK PRODUCTION—by putting "green" workers on the job, lowering shop morale, placing expensive equipment in less trained hands. All this, *in addition* to the direct cost of a major eye accident which some authorities estimate at \$350 or more. Good business judgment dictates that these costs be cut *immediately*. Your AO Safety Representative can show you how 98% of all eye accidents can be prevented by an eye protection program that will pay for itself in six months or less.

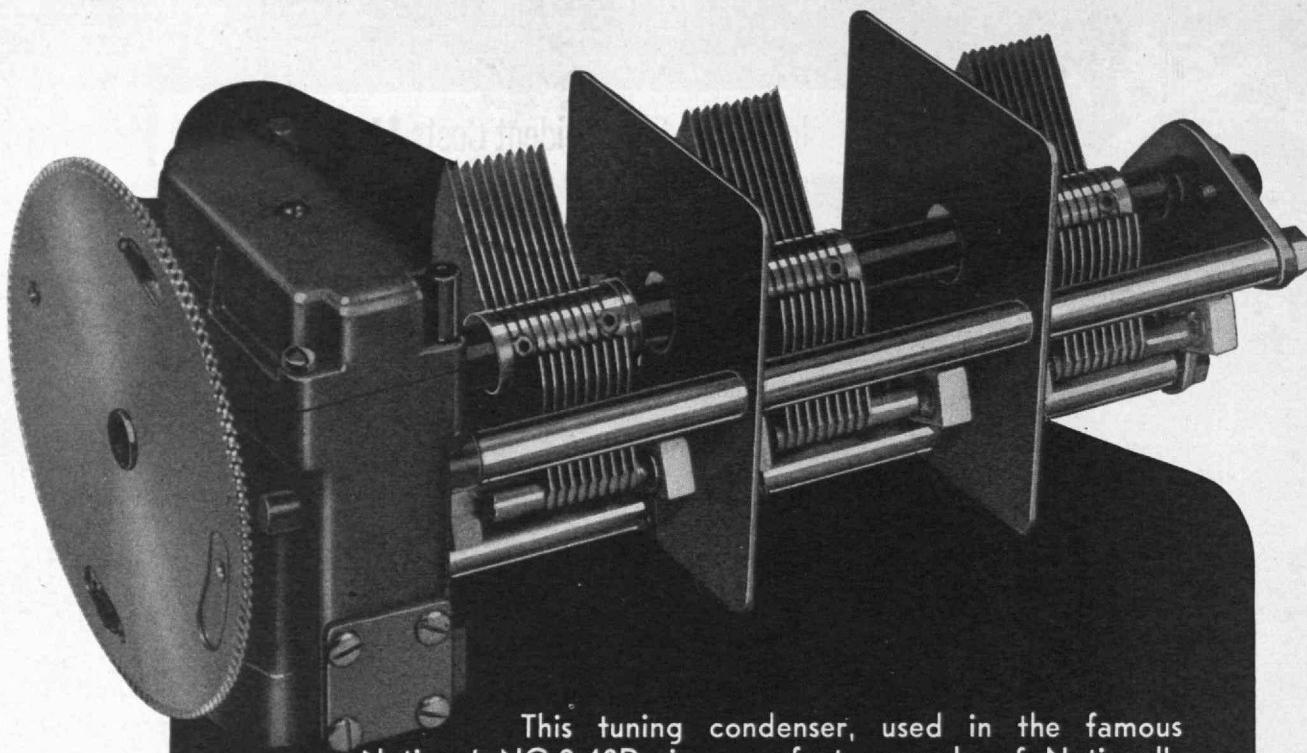
American Optical



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Division

SOUTHBRIIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

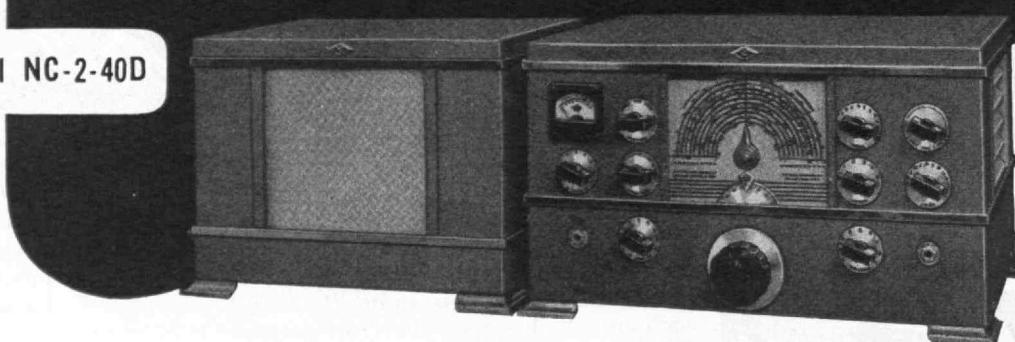


This tuning condenser, used in the famous National NC-2-40D, is a perfect example of National's flawless construction and design. Engineered and manufactured in National's own plant, it is of extremely rigid construction, preventing unwanted frequency modulation due to vibration. Three bearings on the rotor shaft assure permanent alignment. The drive is through a large pre-loaded gear. No strings to deteriorate, no backlash! Each rotor is individually insulated and has its own contact. Stator insulation is low-loss steatite.

With precise, rugged components like this, no wonder National communication receivers lead the field—in any climate, under all operating conditions! National precision components are available at your dealer's.

NATIONAL COMPANY INC., MALDEN, MASS.

The National NC-2-40D

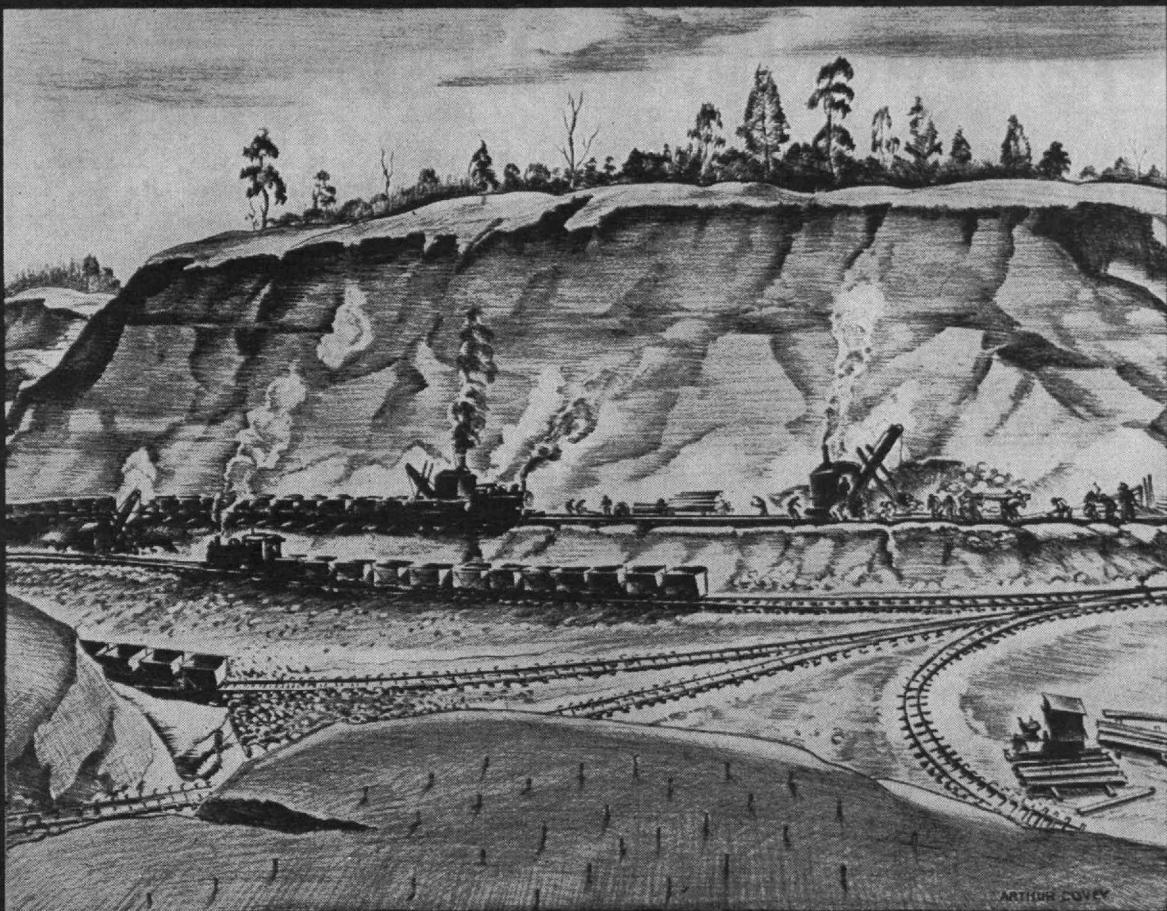


A superb receiver for either commercial or amateur use covering frequencies from 490 kcs. to 30,000 kcs. Calibrated electrical band-spread tuning on the 80, 40, 20 and 10-meter bands. A 40 to 1 main tuning drive mechanism provides exceptional tuning accuracy on all bands. Design features include temperature compensation, automatic voltage stabilization, a series valve noise limiter, new flexible crystal filter and phono input. Operates from 115 or 230 volts AC. Eleven tubes plus rectifier. Try it—compare it—today at your dealer's!

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Ore from Arkansas becomes the world's most widely used abrasive

BAUXITE ore from mines like this is converted by Norton into one of industry's most useful products.

In unique, Norton-developed electric furnaces the bauxite is fused into aluminum oxide abrasive—known the world over by the trade-mark "ALUNDUM".

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And because of its heat-resistant properties Alundum abrasive material is also the basic ingredient of a varied line of Norton refractories.

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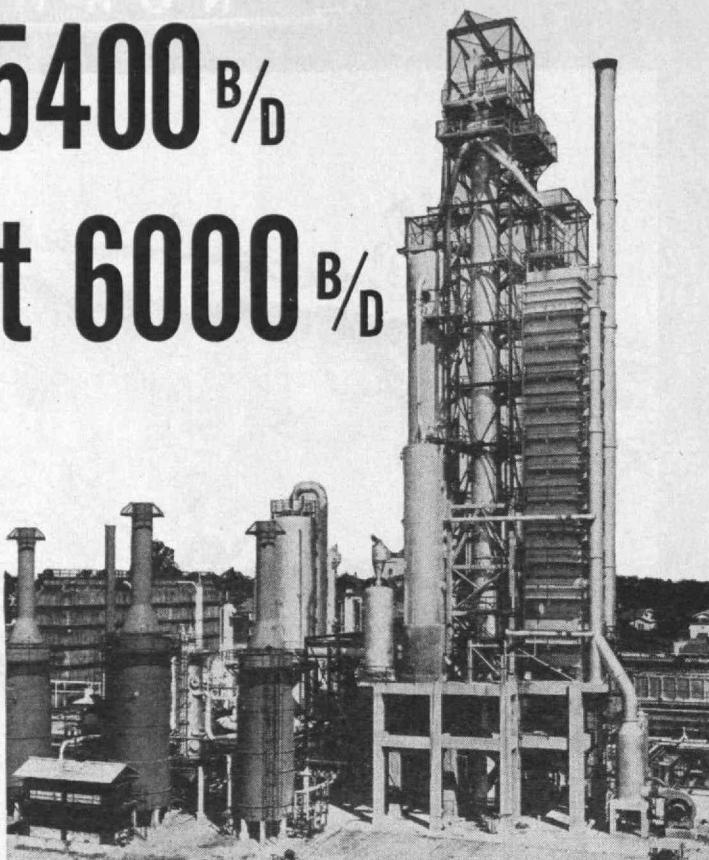
(BEHR-MANNING, TROY, N. Y. IS A NORTON DIVISION)

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REFRACTORIES — POROUS MEDIUMS — NON-SLIP FLOORS — NORBIDE PRODUCTS

designed for 5400 B/D

operating at 6000 B/D

**Lion Oil cat cracker
accepted
after 28 days
initial run . . .**



Typical of Lummus design, careful inspection, skilled construction and experienced operation is the performance of the catalytic cracker designed and built for Lion Oil Company, Eldorado, Arkansas.

This plant—the 31st Lummus catalytic cracking plant—went on stream September 16th. It not only met all guarantees but soon exceeded design capacity. It was accepted by Lion on October 13th after 28 days of continuous operation. On the 85th day of the initial run, the reactor was by-passed for the insertion of larger orifice plates to permit increased charge capacity. 6024 B/D of fresh gas oil charge have already been processed with a possible 7000 B/D in the near future—against a design capacity of 4500 B/D of fresh feed plus 900 B/D recycle.

The unit has also exceeded the guaranteed percentage yield of high-octane gasoline and has produced 3070 barrels per day of 10 lb. RVP gasoline against a 2040 B/D guarantee.

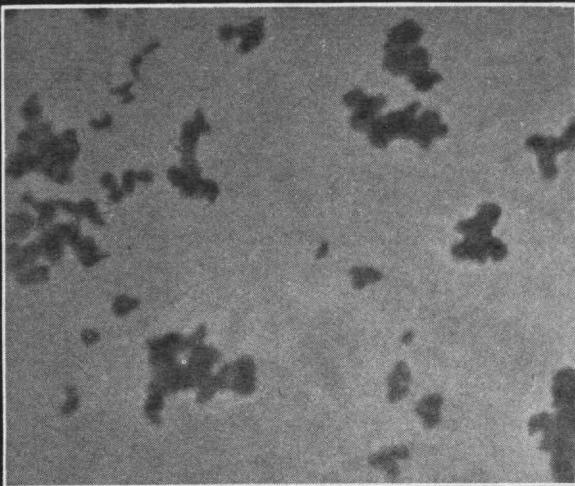
Long initial runs have always been characteristic of Lummus plants. Among many outstanding initial runs is that of a Lummus catalytic cracking plant which ran 240 days before it was shut down for inspection.

THE LUMMUS COMPANY
420 Lexington Avenue, New York 17, N.Y.

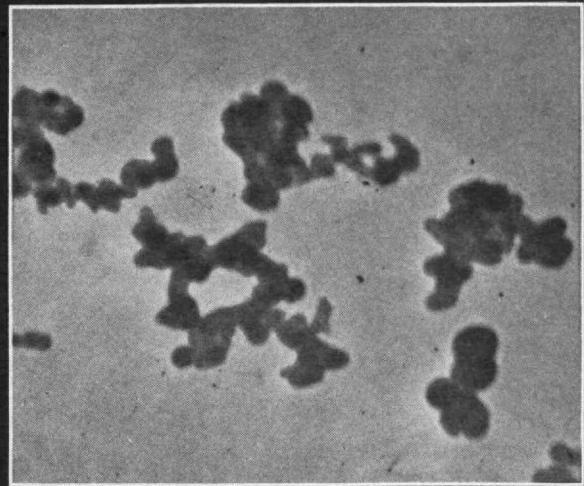
LUMMUS

CHICAGO—600 South Michigan Avenue, Chicago 5, Ill.
HOUSTON—Mellie Esperon Bldg., Houston 2, Texas
LONDON—78 Mount Street, London, W. 1, England

Cabot Research and Development



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Vulcan**distillation
evaporation
extraction
processes and equipment**

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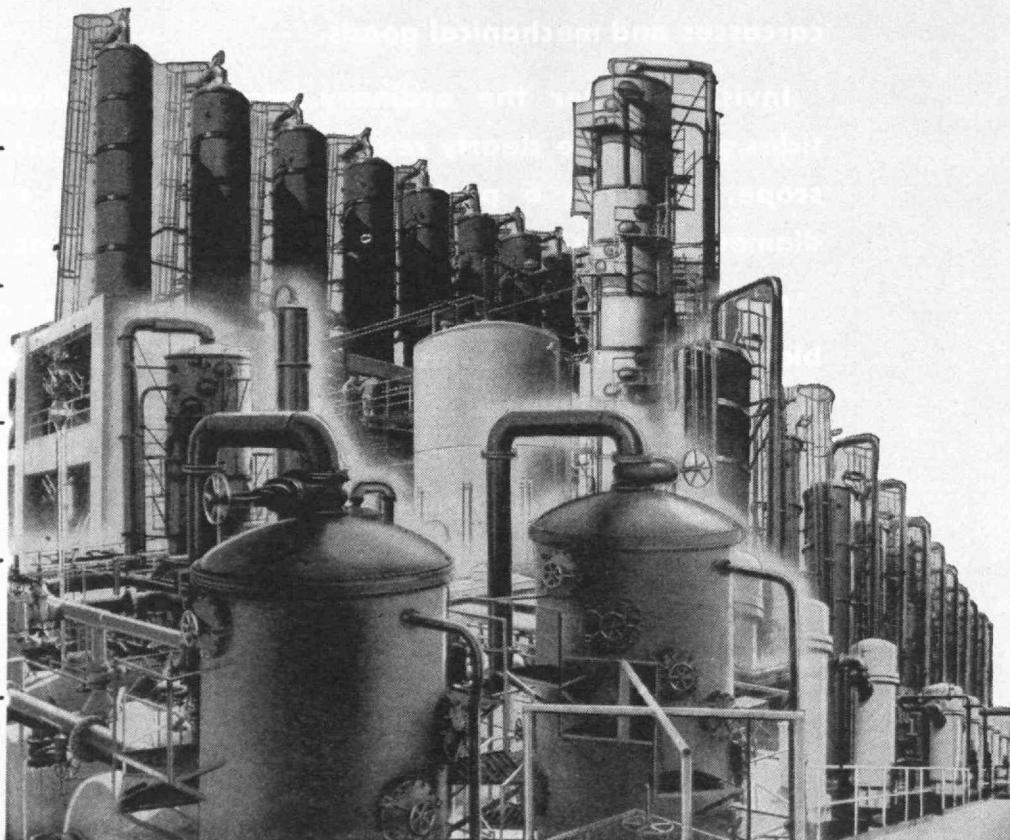
PILOT PLANT

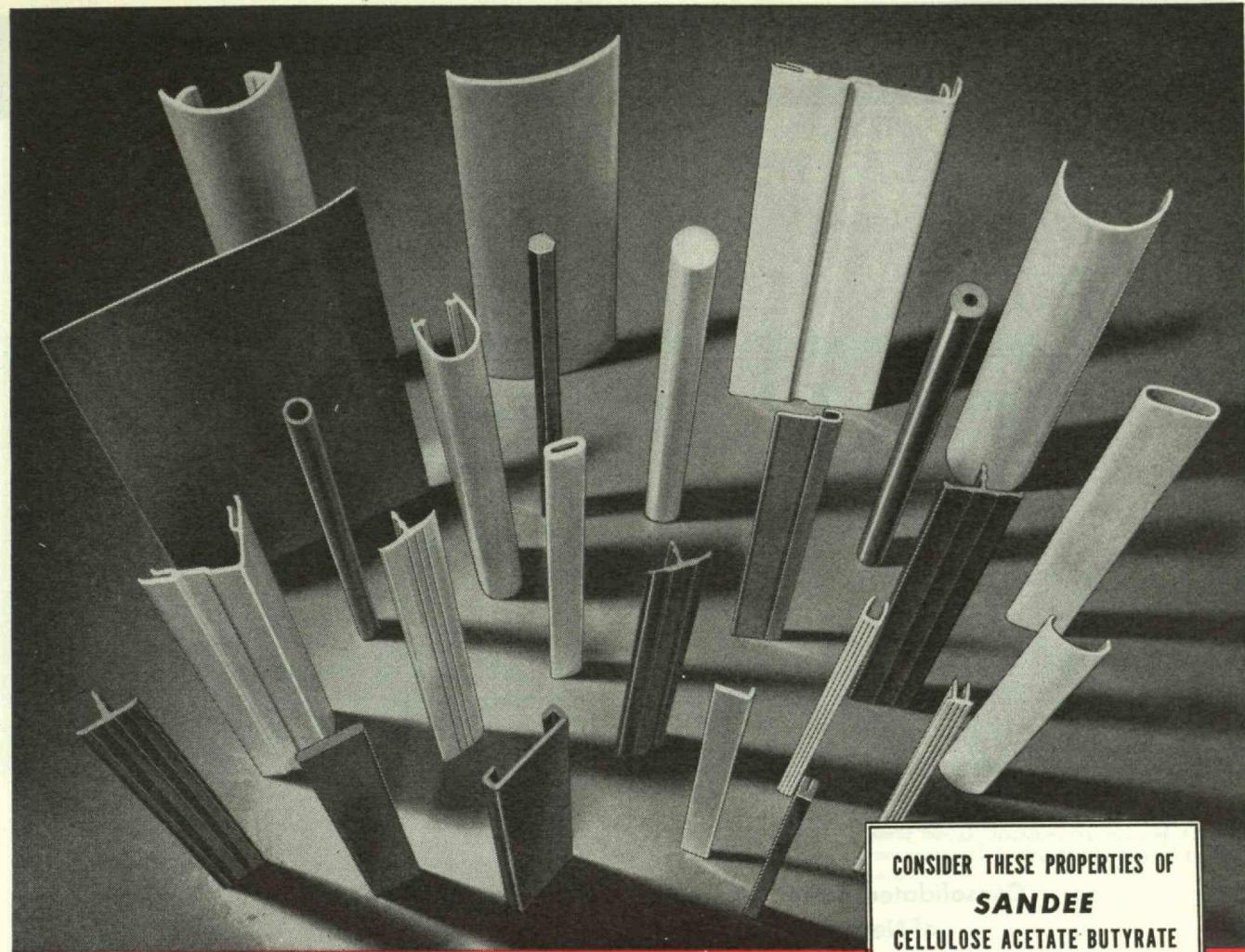
PROCESS DESIGN

MECHANICAL DESIGN

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FIELD ERECTION

INITIAL OPERATION



Sandee CELLULOSE ACETATE BUTYRATE Extrusions

HIS general purpose material, under the trade name TENITE II, has attained an excellent reputation for appearance and serviceability in widely diversified fields. This is not only true in injection molded and fabricated items but is equally true in Extruded Rods, Tubes, and simple and complicated shapes. Colorful, tough, easily machined and easily formed to fit specific contours, it is serving to complete satisfaction in fields ranging from rods and tubes for toys to furniture and refrigerator trim.

Study the properties of this excellent general purpose material, then check with Sandee for confirmation of suitability to your requirements. Sandee's practical know-how in extrusion often helps in altering designs for improvements in functional utility, appearance, and cost.

CONSIDER THESE PROPERTIES OF
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|--------------------------|-----------------------------------|
| 1. Specific Gravity | —1.22 |
| 2. Tensile Strength | —3000 to 5000 p.s.i. |
| 3. Impact Resistance | —Excellent at normal temperatures |
| 4. Heat distortion | —170° to 185°F. |
| 5. Rigidity | —Good to very good |
| 6. Dimensional Stability | —Good to very good |
| 7. Water Absorption | —1 to 2% |
| 8. Burning Rate | —Slow |
| 9. Odor | —Nil to faint |
| 10. Color | —Unlimited |
| 11. Finish | —Excellent |
| 12. Machinability | —Excellent |

SALES REPRESENTATIVES IN 19 PRINCIPAL CITIES

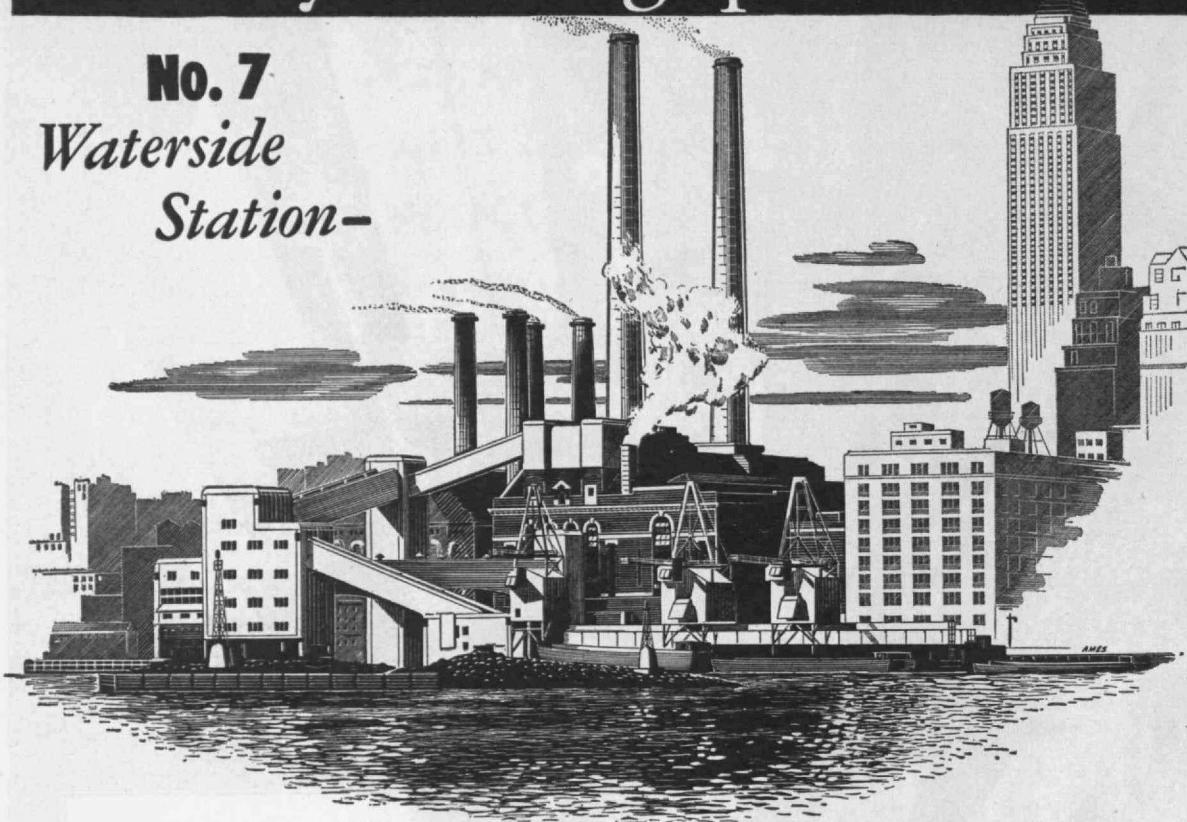
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History-making power stations

No. 7 Waterside Station-



**Consolidated Edison Company
of New York, Inc.**

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Although expanded and improved through the years, the real modernization program of the two plants comprising Waterside began in 1936, when work was started on the installation of eight huge boilers to replace the ninety-two old boilers in Plant 2. Modernization of Plant 1 is now well under way and the two boilers being installed will replace fifty-three. Extensive improvements with respect to turbines and other equipment have accompanied the boiler replacement program.

This is, without question, the greatest modernization project in the entire utility field . . . one of the world's largest power stations completely rebuilt . . .

its capacity *nearly doubled* within the same building space . . . its economy vastly improved.

This policy of continuing modernization, characteristic of the electric utilities generally, is one of the big reasons why this industry is in the unique position of being able to sell its product today at a lower price than before the war. Electricity, long recognized as America's most valuable servant, continues to be America's *best buy*.

Combustion Engineering is proud of its major part in the Waterside modernization program. Eight of the ten high-pressure boilers replacing 145 old boilers are of C-E design and manufacture. Four of these units have capacities of 500,000 pounds of steam per hour, two of 615,000 pounds and two of 1,000,000 pounds.

The association of C-E with Waterside and many other power stations that have made history speaks for itself. The experience, special skills and advanced engineering that have brought about these associations are available to you, whether your steam requirements be large or small.

These three factors are the unwritten plus-values in every C-E contract —

Knowledge — to solve today's, and tomorrow's, steam generating problems.

Experience — to interpret, from a world-wide background in every important industry, the specific needs of each installation.

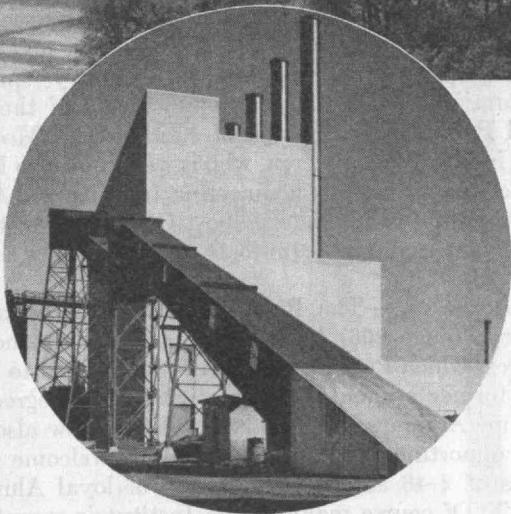
Facilities — to manufacture complete steam generating units for every capacity from 1000 pounds of steam per hour up to the largest

**COMBUSTION
ENGINEERING**

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EXPERIENCE



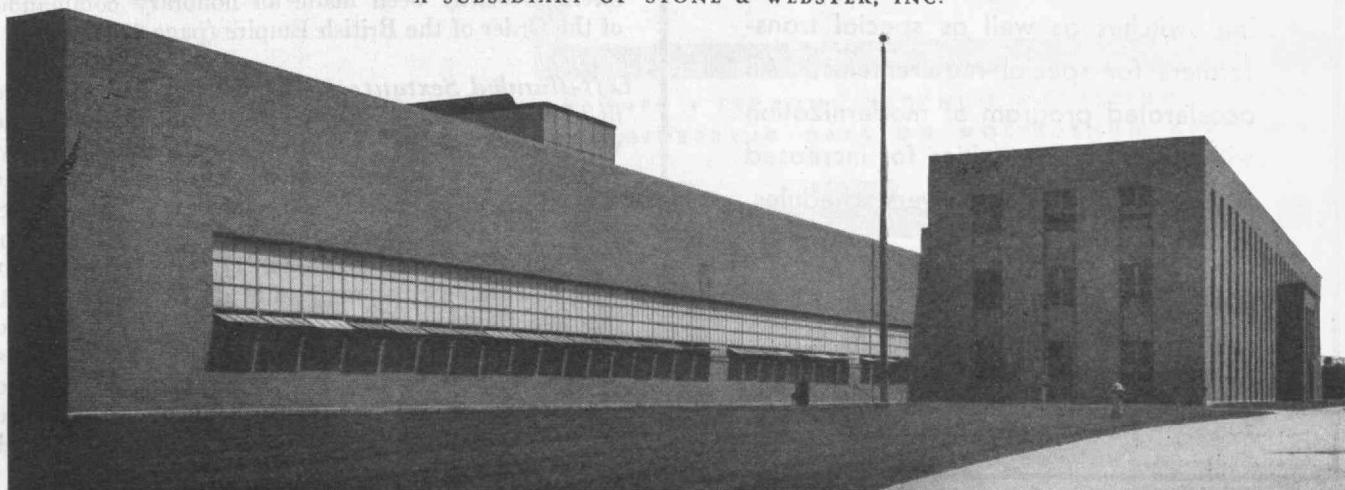
Stone & Webster Engineering Corporation designed and constructed this Plant at Fort Wayne, Indiana, for the Defense Plant Corporation. It was operated during World War II by General Electric Company.

DESIGNED and built during the War, this plant, now owned by General Electric Company, is an example of what Stone & Webster Engineering Corporation offers clients in the industrial fields.



STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.



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Fast

with these

BROWN & SHARPE SIDE MILLS



STAGGERED TOOTH SIDE MILLING CUTTERS.

Alternate right- and left-hand spiral angles with considerable angle of undercut permit these cutters to remove large amounts of metal without destructive vibration and chatter.



SIDE MILLING CUTTERS.

Used in pairs for sizing nuts, bolt heads, similar work. Cutting edges on both sides of teeth and periphery.



HALF SIDE MILLING CUTTERS.

Spiral on top and undercut on side give teeth improved cutting action.

You can count on the inherent qualities of good design and craftsmanship found in these Brown & Sharpe Side Milling Cutters to deliver fast, accurate work—more pieces per sharpening. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

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With the acquisition of the Surges Electric Company of Milwaukee, Hevi Duty can now offer quality dry type air cooled transformers with or without tap changing switches as well as special transformers for special requirements. An accelerated program of modernization will present opportunities for increased production and good delivery schedules.

Write for Bulletin S-4611

HAROLD E. KOCH '22, President

ELTON E. STAPLES '26, District Manager, Cleveland

HEVI DUTY ELECTRIC COMPANY

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THE TABULAR VIEW

Industrial Patterns.—Under this title there appeared on page 209 of the February issue of The Review photographs of unnamed subjects of science, engineering, or industry. The identity of these pictures is given below:

1. Top triangle: Bolt Heads — by Henry M. Mayer.
2. Left: Steel Flooring — by Romeo Rolette.
3. Right: Sand Bags — by Juliette Laserre.
4. Lower left: Wall padding of acoustic dead room of the Bell Telephone Laboratories.
5. Lower right: Wooden Stakes — by K. Stephen.

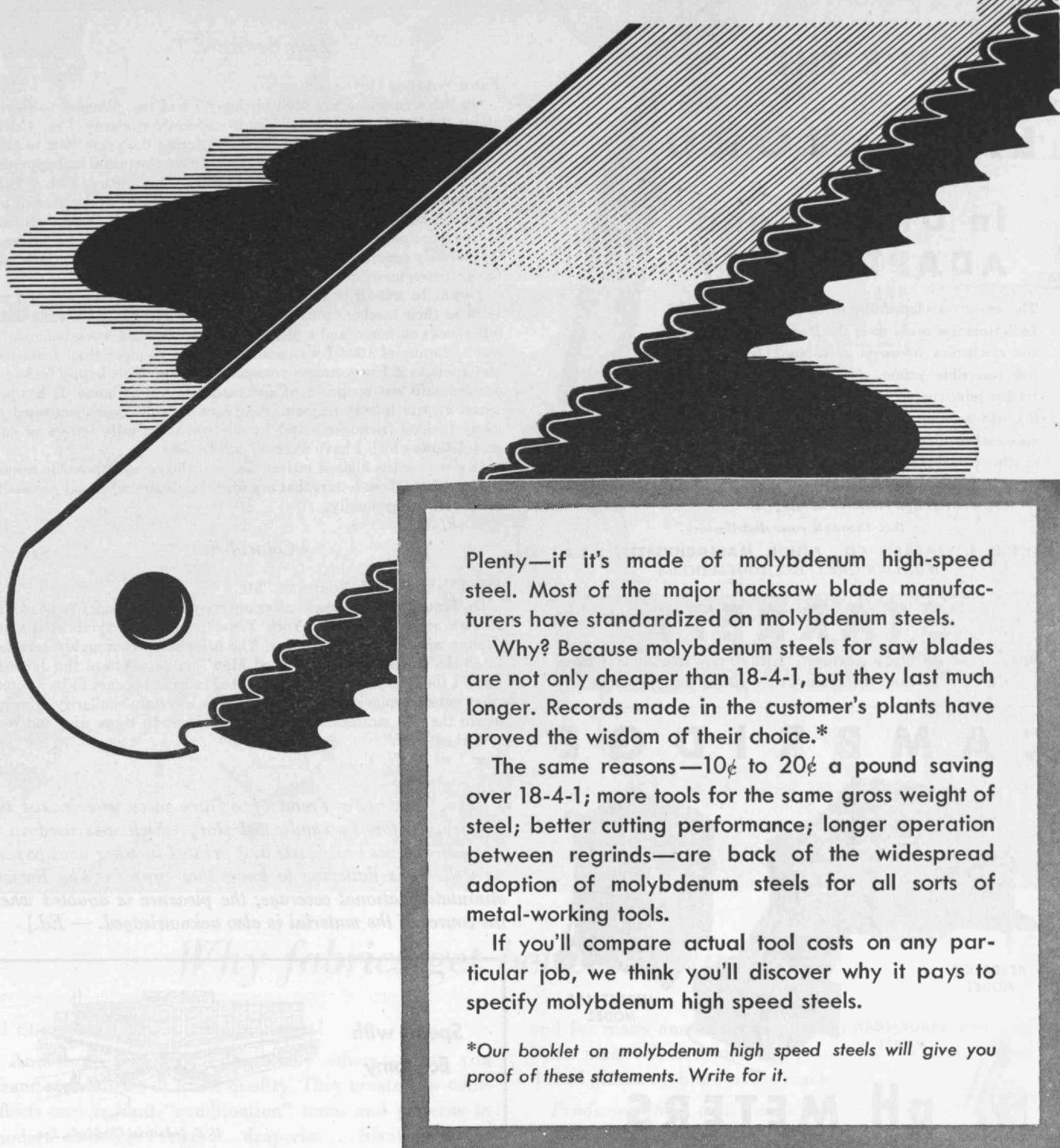
Photograph Number 4 comes from Bell Telephone Laboratories; all others from Black Star.

Cross Continent.—Promontory Point, Utah, was the scene of jovial celebration on May 29, 1869, when the Union Pacific Railroad was joined with the Central Pacific Railroad to connect the West Coast with Omaha and Chicago in the first transcontinental railway system in this country. In "Road to Fortune" (page 260) E. H. CAMERON, '13, describes this famous railroad engineering venture of the post-Civil War period. Mr. Cameron has had extensive experience on many engineering projects throughout the country since his graduation from M.I.T. and is now head of the Technical Publications Division of Jackson and Moreland. As a hobby, Mr. Cameron, who is well known to Review readers, combines his engineering training and writing abilities in portraying the post-Civil War history of important engineering projects.

Diplomawise.—The Review is happy to be able to present (page 266) to its readers the commencement address which PRESIDENT COMPTON delivered to almost 400 former students who received their degrees and became Alumni on February 4. The Review also takes this opportunity to extend a hearty welcome to the Class of 2-48 as the latest group of loyal Alumni of M.I.T. Of course many of the Institute's recent graduating classes have had the pleasure and benefit of Dr. Compton's wisely prepared commencement addresses, but the Class of 2-48 could take justifiable pride in the knowledge that President Compton had added still another to his long list of well-deserved recognitions in having recently been made an honorary commander of the Order of the British Empire (page 271).

Left-Handed Sextants.—Had Hadley had the benefit of advice from psychologists it is not likely that he would have produced an instrument which, for two centuries, inflicted inconvenience on all but southpaw navigators. Such at least is the inference to be gleaned from "Psychology, Men, and Machines" (page 267) by COMMODORE W. MACK ANGAS, '17, who acquaints the reader with recent progress made in the Navy to improve the design and increase the effectiveness of control mechanisms for training and combat use. Almost invariably writing about one phase or another of nautical history, Commodore Angas has been a frequent contributor to The Review since 1940. His article reflects personal rather than official Navy views.

HOW MUCH COST CAN A SAW BLADE CUT?



Plenty—if it's made of molybdenum high-speed steel. Most of the major hacksaw blade manufacturers have standardized on molybdenum steels.

Why? Because molybdenum steels for saw blades are not only cheaper than 18-4-1, but they last much longer. Records made in the customer's plants have proved the wisdom of their choice.*

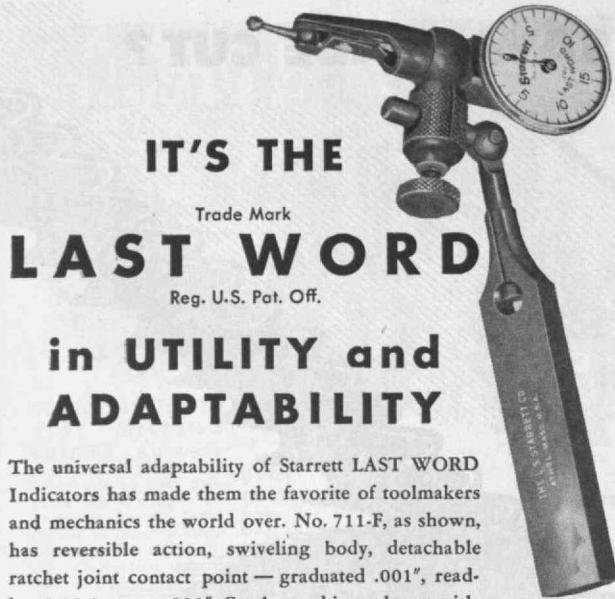
The same reasons—10¢ to 20¢ a pound saving over 18-4-1; more tools for the same gross weight of steel; better cutting performance; longer operation between regrinds—are back of the widespread adoption of molybdenum steels for all sorts of metal-working tools.

If you'll compare actual tool costs on any particular job, we think you'll discover why it pays to specify molybdenum high speed steels.

*Our booklet on molybdenum high speed steels will give you proof of these statements. Write for it.

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in UTILITY and ADAPTABILITY

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For complete information, write for new
Starrett Dial Indicator Catalog "L"

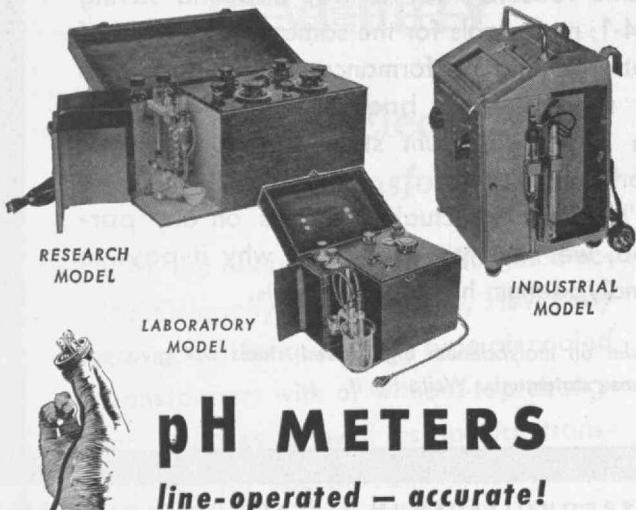
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HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

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pH METERS

line-operated — accurate!

The three models illustrated above incorporate many new and important advantages. All are AC line-operated . . . no battery nuisance. Laboratory and Research models use electron-ray tube for precise null-point indication. Industrial model is a direct-reading instrument, ruggedly built for plant use.

Accuracy: Research .02 pH, Laboratory .05 pH, Industrial .10 pH. Other line-operated Cambridge pH equipment includes single- and multi-point indicators and recorders. Send for bulletin 910-MR.

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3707 Grand Central Terminal, New York 17, N. Y.
Pioneer Manufacturers of
PRECISION INSTRUMENTS

MAIL RETURNS

Four Score and Ten

FROM WILLIAM HOVGAARD:

On the occasion of my 90th birthday I had the pleasure to receive about 100 letters of congratulation from former students of my Course in Naval Construction at M.I.T., given during the years 1902 to 1933.

I wish first to thank them most cordially for the praise and appreciation expressed in those letters, and I wish I could answer each of them individually. This, however, is impossible on account of my present low state of health and strength, and I must limit myself to reply by means of this more general letter. In addition I intend to send, and have in fact already commenced sending, a few individual letters to those who have written more special or personal letters to me.

I want to tell all of my former students that I have enjoyed my work as their teacher, not only as an important and interesting duty, but also as an honor and a pleasure. When I started work teaching at the beginning of 1902 I was nearly 46 years younger than I am now and I felt as if I was among younger comrades. This happy feeling of comradeship was reciprocated and made me feel at home. It has persisted in principle throughout the years and has been confirmed by many lifelong friendships and by the recent friendly letters of congratulations which I have received and treasure.

It gives me the highest satisfaction and the greatest possible reward to know from these letters that my work has been useful and successful and of service generally.

Summit, N. J.

Coincidence

FROM FREDERIC W. NORDSIEK, '31:

On January 25, two weeks after my copy of the January issue of The Review arrived, the New York Times published a syndicated story dealing with calluses and burns. The news story thoroughly corroborated the statements in "Marked Men" on page 148 of the January issue. I thought you might be interested in what appears to be a somewhat unusual coincidence, especially since a certain similarity of wording in the two stories may have been evident to those who had read "Marked Men."

New York 23, N. Y.

[*Mr. Nordsiek's Trend of Affairs piece was indeed the inspiration for the syndicated story which was used in a number of news broadcasts and printed in other newspapers as well. It is flattering to know that copy in The Review stimulates national coverage; the pleasure is doubled when the source of the material is also acknowledged. — Ed.*]

Speed with
Economy



U. S. Industrial Chemicals, Inc.

In our weekly "job meetings" each building operation comes up for examination in detail by our full staff, with complete minutes of each meeting sent to the owner. In this way, work is continuously planned ahead and coordinated.

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INDUSTRIAL CONSTRUCTION
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"The outward forms the inward man reveals"—OLIVER WENDELL HOLMES



Why fabrics get better all the time

31 CHEMICALS helped make that shirt!

And those chemicals—plus many others—bring you brand-new fabrics of finest quality. They create new color effects and radiant “combination” tones and patterns in modern clothing...rugs...draperies...blankets. These better fabrics are made possible by *better materials*.

Chemically made fibers, for example, that challenge nature's best in wear and appearance. Better chemicals, too, in wetting agents...shrink-proofing treatments...solvents for dyes...and other “musts” that are a part of modern textile manufacturing.

Also in the picture are stainless steels for dyeing vats that are easy to clean and resistant to corrosive acids and alkalies. Plastics for bobbins, pins, levers, control handles

and for many another tool part. And even such *new and better materials* as synthetic sapphire for the thousands of thread guides on huge textile machines.

Producing these better materials and many others—for the use of science and industry and the benefit of mankind—is the work of the people of UNION CARBIDE.

FREE: You are invited to send for the illustrated booklet, “Products and Processes,” which describes the ways in which industry uses UCC’s Alloys, Carbons, Chemicals, Gases and Plastics.

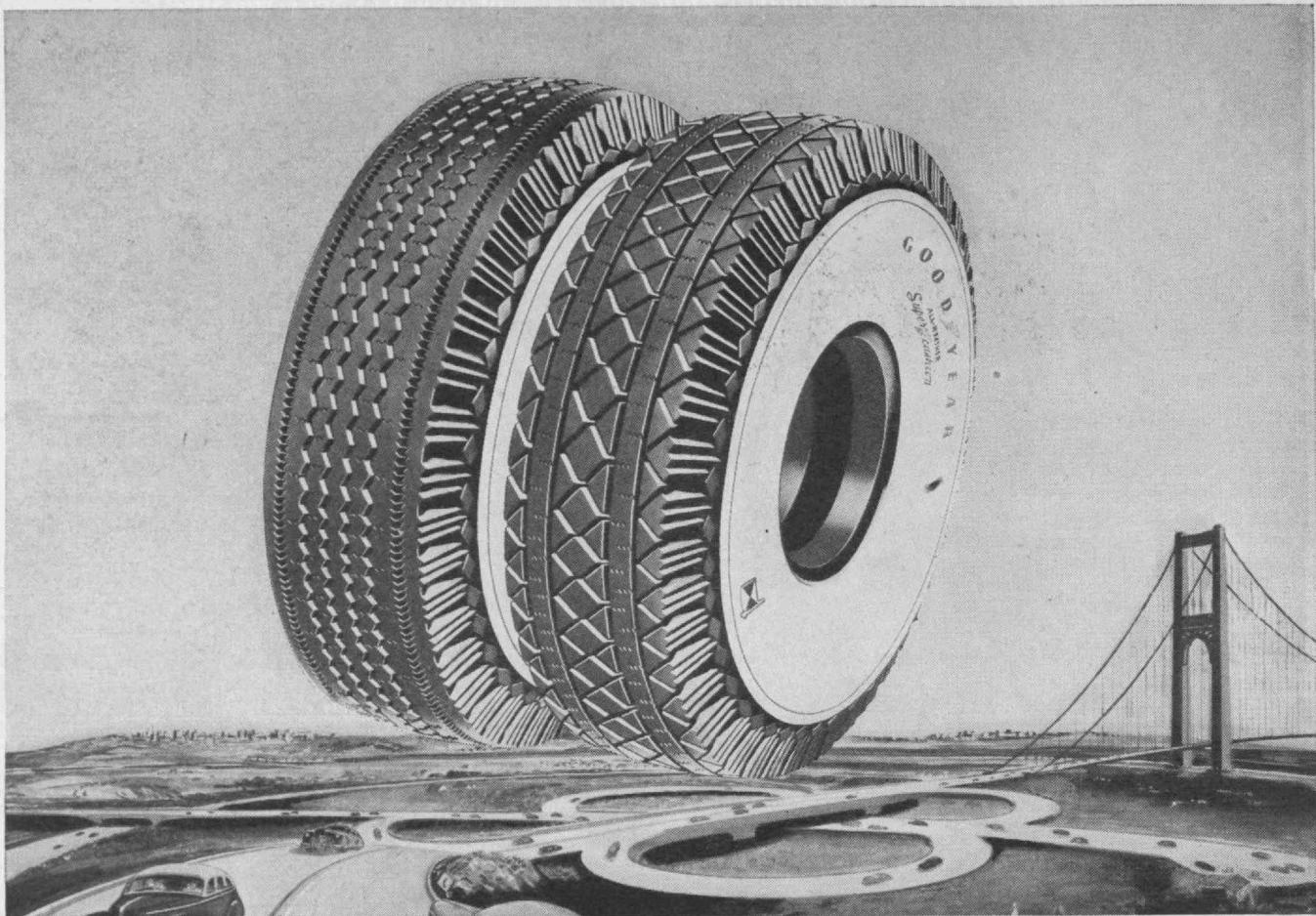
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Amazing...what this new kind of tire will do for your car!

PICTURED ABOVE is the first new *kind* of tire in fifteen years! It's the great new Super-Cushion—developed by Goodyear. It runs on only 24 pounds of air—and offers all these advantages:

Softer Ride—Bigger and softer, the Super-Cushion gives you an unbelievably smoother ride!

Better Car Handling—Your car hugs the road, seems to float through traffic, to flow around turns!

Fewer Rattles—Super-Cushions soak up shock and

vibration. You get fewer rattles, fewer repair bills!

Greater Mileage—Super-Cushions consistently average more mileage than the finest standard tires!

Extra Blowout Resistance—They "roll with the punch," are harder to cut, bruise, blow out!

Better Car Looks—Because they're bigger, Super-Cushions vastly improve your car's looks!

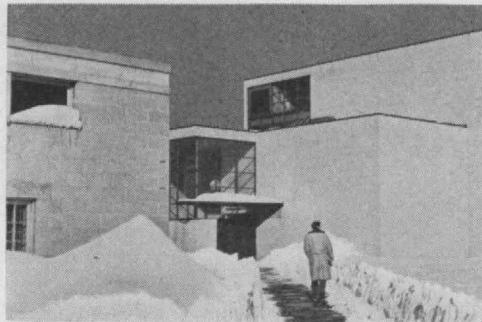
See Your Goodyear Dealer! If he hasn't Super-Cushions in your size at the moment, he will soon!

The new *Super-Cushion*

by **GOOD**  **YEAR**



Super-Cushion T.M., The Goodyear Tire & Rubber Company



THE TECHNOLOGY REVIEW

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Raymond E. Hanson

Early Morning, Gloucester

THE TECHNOLOGY REVIEW

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The Trend of Affairs

Illusive Sweetness

CERTAIN substances other than sugars taste sweet. Saccharin (*o*-sulfobenzamide, $C_7H_5O_3NS$) is several hundred times sweeter than common cane or beet sugar, although the exact ratio of sweetness depends upon respective concentrations of solutions compared. Saccharin was first prepared in 1879. It has long been accepted as not toxic to human beings and, as it has no food value, has gained limited use to sweeten foods for persons on restricted diets, such as diabetics or those wishing to lose weight. Then saccharin tablets suddenly appeared upon many home dining tables during the wartime sugar shortages a few years ago, for use in place of the absent contents of the sugar bowl.

During the war years when sugar supplies were at their lowest ebb, it was proposed that products like carbonated beverages be sweetened with saccharin instead of with sugar. Such substitution was, however, forbidden by governmental food authorities, on the basis that consumers unconsciously associate sweet taste with food-energy value, since all normally sweet foods are high in sugar, and hence high in calories. Therefore a product that tastes sweet but has no caloric value was considered to be adulterated.

The wisdom of this ruling has now been confirmed by a research report from the University of Budapest just published in this country. This report shows that saccharin solutions taken by mouth lowered concentration of sugar in the blood stream of human subjects. Apparently this effect resulted from reflex stimulation of insulin secretion by the sweet taste of the saccharin. Insulin is the hormone, generated by the pancreas, that governs carbohydrate metabolism. The sweetness of sugar presumably has a similar effect, but when sugar is consumed the increased insulin production is offset by immediate availability of sugar through the digestive tract, with the result that the level of the sugar in the blood stream is not thus depressed.

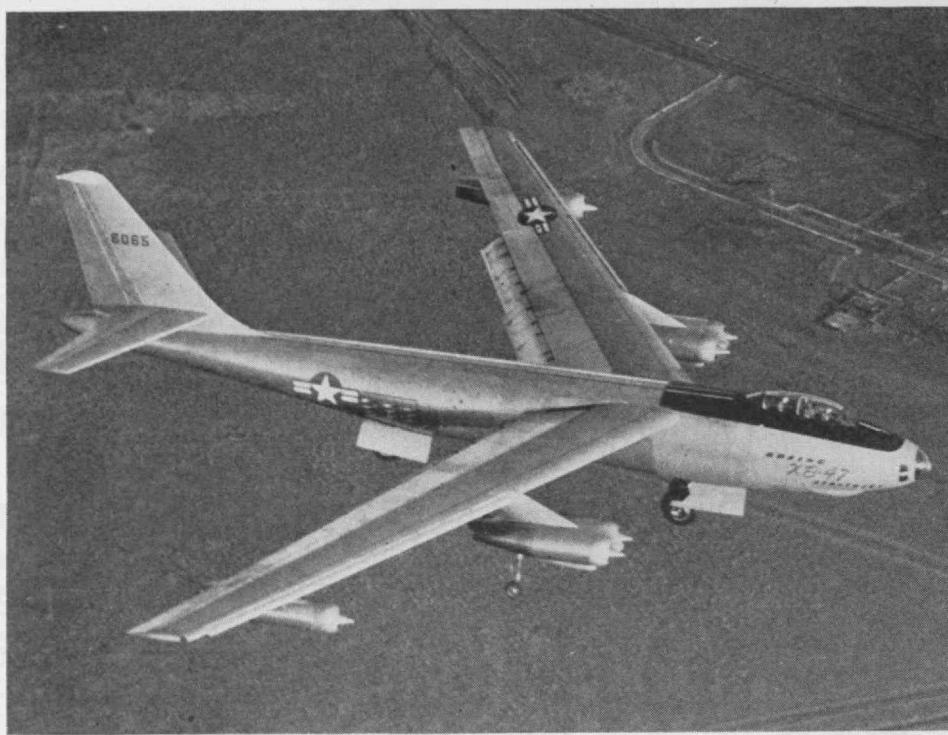
Depression of blood sugar by saccharin is transient, and is not necessarily baleful. Nevertheless, the possibility of physiological maladjustments becomes apparent in the use of substances like saccharin that have the taste of a normal food but no food value. This is one immediate practical significance of the Hungarian report.

But even more striking is a theoretical implication of this research. By showing that the mere taste of a food triggers the physiological mechanisms necessary for its assimilation, this study underlines the extreme complexity of the interrelationships that govern the functioning of the human organism.

From Fossils to Seeds

IN February, 1946, Chinese explorers came upon a new and striking kind of fir tree in a remote valley of central China. Only three specimens were found, but later in 1946 a second expedition located 25 more trees, all metasequoias, a rare species that thrived 100,000,000 years ago, and long thought to be extinct, since it had been previously known only from fossil records. Only a few other trees now living are of such ancient origin, including California redwoods, and the ginkgo of China.

Although the discovery of living metasequoias was of unusual scientific value and interest, investigators discovered that so few specimens of the tree were living that it was in danger of extinction. To prevent the loss of a species which had been on earth long before man appeared, the Arnold Arboretum of Harvard University organized an expedition to secure seeds from the tree. After three months of field work, during which nearly 100 more metasequoias were located, the botanists secured an ample supply of seeds. These seeds which look much like rolled, dried corn kernels have now arrived at the Arboretum. Botanists will plant them in carefully selected soil and Elmer D. Merrill, Arnold Professor of Botany at Harvard, expects that 10 years of growth will produce a tree five or six feet in height. However, very little is



provide lateral stability during ground operations. Power is developed by six turbo-jet engines capable of exerting a total of 24,000 pounds of thrust, plus 18 Aerojet jet-assisted take-off rocket motors, each of 1,000 pounds thrust. Total thrust, therefore, is 42,000 pounds.

known of their growth patterns; it is not even certain that the seeds will germinate in New England climate. To overcome climate difficulties the Arboretum is sending seeds to gardens throughout the United States and Great Britain in the hope of finding the best growing conditions for the Chinese tree.

As it grows in China, the metasequoia is a large tree, usually growing more than 100 feet high and with a trunk of seven and a half feet in diameter. Although a cone-bearing tree, it loses its leaves in the winter months. Botanists compare its appearance to the swamp cypress which grows in the southern sections of the United States.

Like the sequoias of the West Coast, this species can scarcely be distinguished from the fossil forms of prehistoric times, and thus it presents one of the best examples of the persistence of life forms through many millions of years.

Cold Air

SOUND waves can be used to measure upper atmosphere temperatures stated Everett F. Cox of the Naval Ordnance Laboratory at a joint meeting of the American Physical Society and the Institute of Aeronautical Sciences at Columbia University.

Around a source of loud noise, such as the explosion of an ammunition dump, there are alternate rings of noise and silence, Dr. Cox said. No noise may be heard at one place and a few miles farther away windows may be shattered by sound waves. This condition is caused by layers of hot air in the upper atmosphere which serve as sound reflectors.

Since sound waves are bent back to the earth by the hot layers of the upper atmosphere, measurements of sounds received at great distances from explosions can be used to calculate temperatures of the earth's outer air layers. From observations of large-scale explosion such as that at Helgoland last year, the earth's atmosphere

The world's first swept-wing bomber, the Boeing XB-47 Stratojet experimental jet bomber, made its maiden flight just 44 years to the day after man's first powered flight in a heavier-than-air machine off the sands of Kitty Hawk, N. C., and shortly before the death of pioneer aviator Orville Wright.

The radical new six-jet craft, whose design forecasts the shape of high-speed aircraft of the future, remained aloft 50½ minutes. It was piloted by Robert M. Robbins, '38, and Scott Osler, who expressed satisfaction with the plane's performance after its initial flight. Top speed of the new bomber was not announced but the Air Force revealed that the XB-47 was "in the 500 mph class," that it was designed to carry more than 10 tons of bombs, and has a design gross weight of 125,000 pounds. Span of the XB-47 is 116 feet, and length 108 feet. The tail reaches a height of 28 feet from the ground. The landing gear consists of two double-wheel units which fold forward into fore and aft sections of the slim fuselage. Small outrigger wheels, which retract into the inboard power plant nacelles,

has been found to be divided into three layers of widely different temperatures. The first layer of air above the earth, extending 8 to 20 miles, averages about 75 degrees F. below zero. The next, containing a high proportion of ozone which absorbs ultra-violet rays from sunlight which heats it, averages about 100 degrees above zero. Beyond this is another layer of colder air, and at still higher altitudes the temperature again rises.

The research is important in supersonic flight problems.

Contributions to Physics

INDICATIONS of the Institute's position in the field of modern physics may be gleaned from the program of the annual meeting of the American Physical Society which was held at Columbia University from January 29 to 31. With 218 scientific papers scheduled for presentation, close to the record, 26 papers (or 11.9 per cent of the total number) were presented by members of M.I.T.'s teaching and research staff. Such participation does not include meetings at which Faculty members presided, nor does it include papers presented by Alumni who are not now on the staff at M.I.T. The figures quoted above, therefore, serve as a guide to the extent in which the Institute shares in the development of physics in the United States.

Invited papers were presented by Professor Hsue-Shen Tsien, '36, who spoke on "Wind Tunnel Testing Problem in Super-Aerodynamics"; by Professor Wayne B. Nottingham who outlined "The M.I.T. Electron-Physics Programme: Past, Present and Near Future"; and by William P. Allis, '23, Associate Professor of Physics, who discussed "Electrical Phenomena in Gases at Microwave Frequencies."

Papers in the more highly theoretical fields enumerated below were delivered by: Sanborn C. Brown, 10-44, and Martin Deutsch, '37, on cosmic rays and counters; D. Q.

Posin, Melvin A. Herlin, and Sanborn C. Brown on electron physics; Arthur F. Kip, Robert D. Arnold, '244, and Herbert B. Callen, '47, on magnetism and nuclear resonance; Malcolm W. P. Strandberg, Tunis J. Wentink, and Richard E. Hillger on optics; George E. Valley, Jr., '35, John M. Blatt, Robert W. Williams, '246, and Robert I. Hulsizer, Jr., '09, on cosmic rays; Arthur R. von Hippel on the solid state semiconductors; Bernd T. Matthias, Arthur R. von Hippel, James W. Davisson, '43, and Robert G. Breckenridge, '42, on solid state and ionic crystals; Clark Goodman, '40, Edward L. Brady, and Martin Deutsch on neutron physics; and Theodore A. Welton, '39, Herman Feshbach, '42, and Victor F. Weisskopf on theoretical physics.

Diamond-Studded Amplifiers

MEANS for amplifying electrical currents through use of suitable control systems are certainly no longer novelties. Electromechanical amplifiers were first tried in telephone systems between Boston and Amesbury, Mass., as early as 1904, and were used commercially on circuits between New York and Chicago between August, 1904, and February, 1905. By 1912 the audion which DeForest invented in 1906 had been developed into a very much improved electronic amplifier and oscillator which was practical in every respect. Virtually all modern radio receivers use one (or more) tubes as oscillators and several tubes as amplifiers. Thus, a foremost scientific novelty of four decades ago has become a household necessity today.

If history is to repeat itself, recent research by Kenneth G. McKay, '41, and his associates at the Bell Telephone Laboratories, holds forth the possibility that amplifiers of the future could very well be diamond-studded. Such a possibility does not indicate a return to the ostentation of a Jim Brady. Rather does it come about as a logical conclusion of research which has brought to light a radically new method of controlling the flow and amplification of electric current which may have far-reaching influence on the future of electronics. The method is based on the discovery that a beam of electrons shot at an insulator — diamond chips in this case — may release currents which are several hundred times as large as that in the original electron beam.

The technique holds promise of opening up a new approach to the design and use of certain types of electron tubes. It makes probable the development of important new electron tubes which do not exist today, particularly for use at very high frequencies. The new technique for producing currents from insulators by electron bombardment (much as currents are released from photoelectrically active conductors activated by light) is expected to supplement rather than replace existing electronic techniques.

Dr. McKay's work is also expected to be of considerable theoretical value, for it provides a new and powerful tool with which scientists hope to learn more about the fundamental structure of solid matter and how it behaves under the impact of electrons.

The experiments of Dr. McKay using electron bombardment stemmed directly from previous pioneer research in which current was induced in diamonds by bombarding them with alpha particles, those relatively heavy, positively charged bits of matter shot off by



Bell Telephone Laboratories

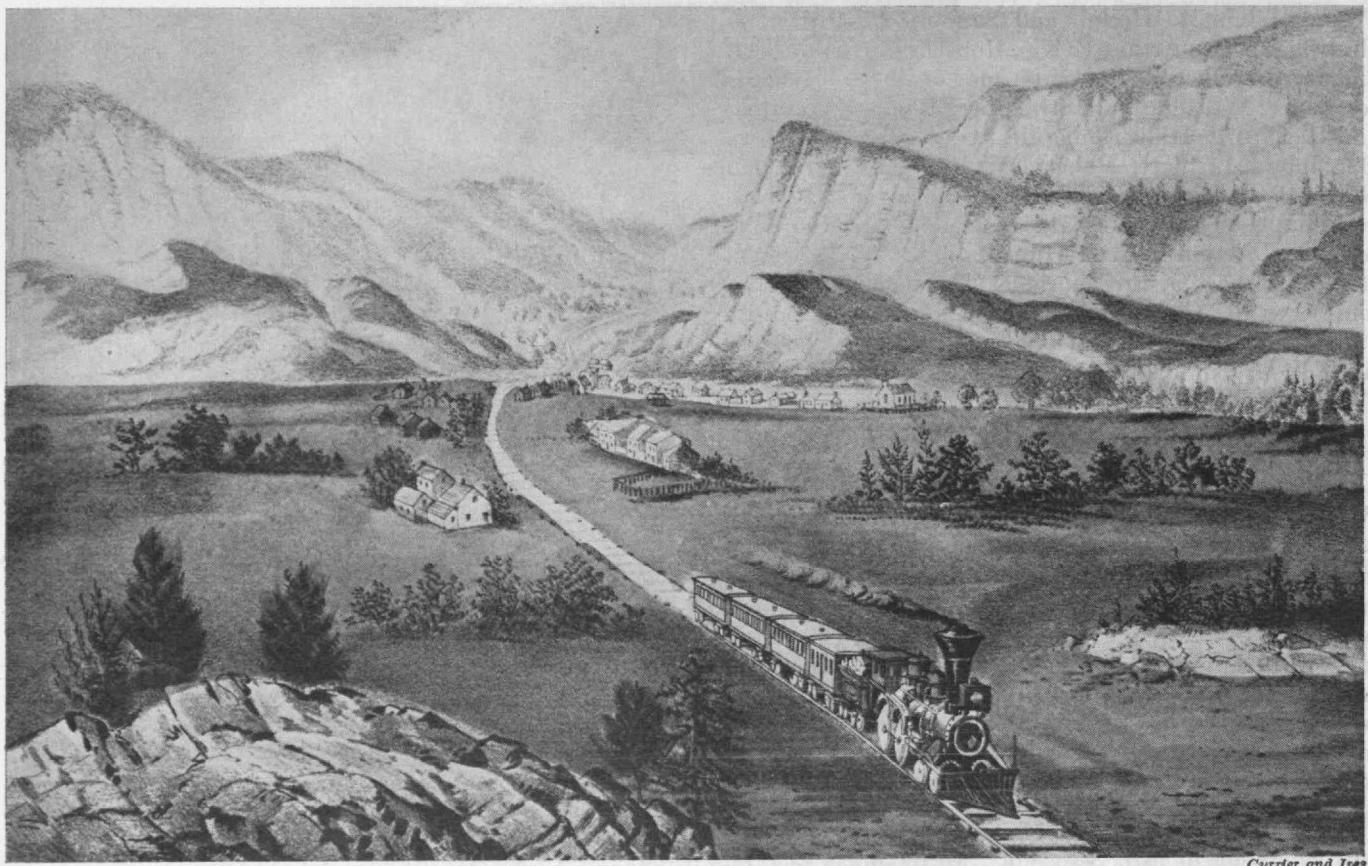
In pioneer experiments conducted by Kenneth G. McKay, '41, at the Bell Telephone Laboratories, tiny diamond chips, bombarded with a beam of electrons, have been found to yield electric currents as much as several hundred times as large as the original beam. This new method of controlling the flow and amplification of current may have far-reaching influence on the future of electronics. A. J. Ahearn, who was associated with Dr. McKay in the investigation, is shown placing the mounted diamond chips in a test circuit to check their induced conductivity under alpha particle bombardment, an associated phase of the research.

radioactive substances. The earlier investigation promises development of a new and improved laboratory tool for detecting and counting alpha particles. Such a device would do essentially the same thing as the familiar Geiger counter but appears to offer the advantages of smaller size, lower operating voltage, and a faster counting rate.

Inducing electric currents in diamonds by bombarding them with relatively lightweight electrons proved to be considerably more difficult than bombardment with alpha particles. It was found that electrons became trapped in the tiny imperfections which are present in all crystals so that after the first fraction of a second, the induced current tended to waste away under the opposition of the trapped electrons.

To overcome this blocking effect an alternating voltage was applied to the diamond chip so that current flowed through the diamond one way for a fraction of a second and then in the other direction, reversing itself 120 times a second. Alternately negative and positive charges are drawn through the crystal and some of each kind are trapped. The positive charges thus collected neutralize the effect of the trapped, negatively charged, electrons, and the induced current is allowed to flow freely.

An important feature of this new technique is that the induced currents are produced so quickly that it has not been possible to measure the time required for their production. It appears certain, however, that less than one ten-millionth of a second is required for such currents to become established.



Currier and Ives

Road to Fortune

*Congressional Lobbying, Indian Fighting, Superb Engineering
— All Entered into the Construction of the
First Transcontinental Railroad*

BY E. H. CAMERON

An example of skillful engineering organization, the building of the Pacific Railroads was outstanding. It was also one of the most dramatic American performances of the Nineteenth Century, in public interest far transcending any modern construction venture. This drama was played on the huge stage of the Great West, from the prelude of daring explorations to the stirring scenes of activity from Sacramento to Omaha, with the scene often shifting to political Washington where the huge government grants were decided upon. Presidents Lincoln, Johnson, and Grant played their roles in crises requiring executive decisions; would-be presidents damaged their political chances by their inept performances during the acts of this great drama. There were financiers with keen foresight and speculators of shrewd daring: Durant, the Ames brothers, Stanford, Huntington, Charles Crocker, and Hopkins. The fine traits of character and superior technical genius of the outstanding engineers of the cast, Theodore D. Judah and Grenville M. Dodge, became readily apparent as the play progressed.

The lesser characters of the play — surveyors, bridge builders, graders, and tracklayers — went armed. For

bands of Snakes, Crows, Blackfeet, Arapahoes, and Sioux, made desperate by brutal aggressions of the white race, were on the war path, and killed hundreds of workers and engineers before the railroads were completed. Such was the price of railroad progress.

With increasing tempo, the drama went on; records of railroad construction were shattered, and in the sixth year, an audience consisting of all America watched the race of the Union Pacific building westerly, with the Central Pacific laying its tracks toward the East. The climax was melodramatic, when the two lines met at Promontory Point, Utah, on May 10, 1869. Bearded railroad officials drove gold and silver spikes in a polished laurel tie, bearing an inscribed silver plate, while soldiers, Mormon elders, and emigrants looked on. The silver track sledge was wired to make an electrical contact, which operated telegraph receivers in cities and towns from San Francisco to New York. Wine flowed freely, and Bret Harte wrote a poem:

What was it the Engines said,
Pilots touching, — head to head
Facing on the single track,
Half a world behind each back?

Two Engineers

The names of two engineers are outstanding in the Railroads' story: Theodore Dehone Judah for the West and Grenville Mellen Dodge for the East.

Judah, who died when not quite 38 years old, was a genius at building railroads. Born in New England, a graduate of Rensselaer Polytechnic Institute, with a fine record on railroad work, he became obsessed with a single idea. It was his ambition to become the engineer who should construct a continental railroad across the Great West. He was called an enthusiastic lunatic — a fanatic. He became the first chief engineer of the Central Pacific Railroad Company, but died when construction had barely started. The genius and courage of Judah were exhibited in his determination of a suitable Sierra crossing. It was, like many examples of genius, a simple solution, as subsequent paragraphs will reveal.

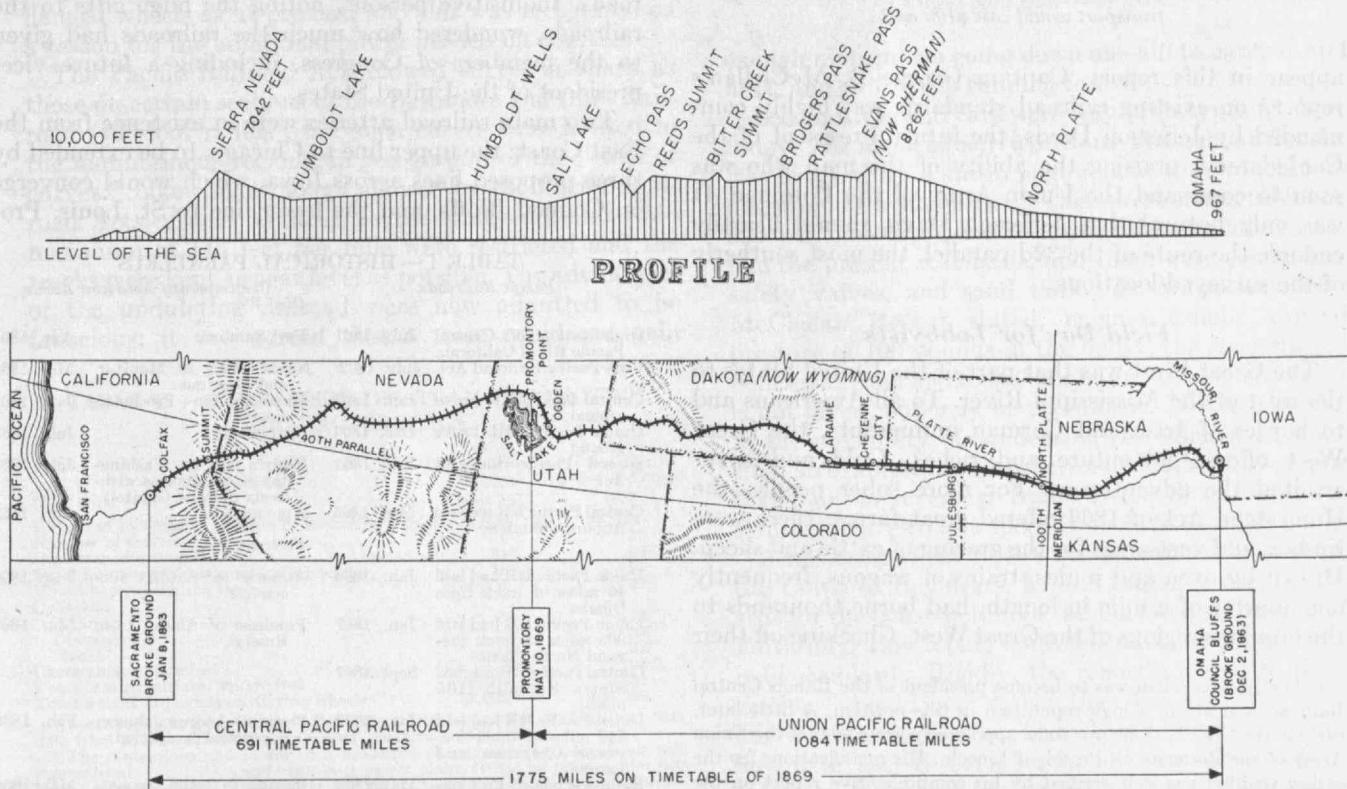
Grenville M. Dodge, of the Union Pacific, was five years younger than Judah. He was a Massachusetts man, a graduate of Norwich University, who, after a period of railroad survey work, entered the United States Army. He rose to the rank of major general of volunteers in the Civil War and, in the year 1866, resigned from the Army to become the chief engineer of the Union Pacific Railroad. With the successful completion of this project Dodge turned to railroad construction in the Southwest and elsewhere. Throughout his long life his advice and organizing ability were called upon in railroad enterprises in America, Russia, China, and other countries.

Reconnaissance

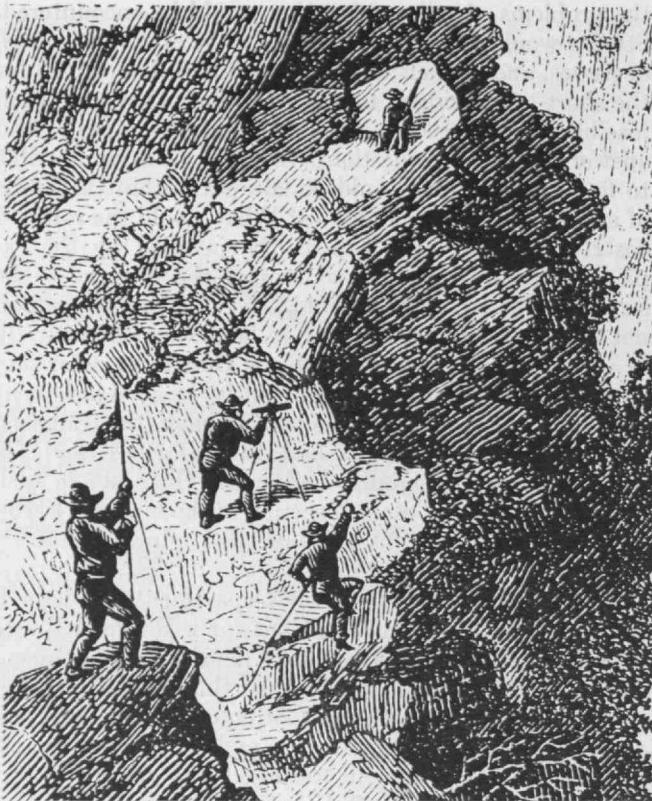
To plan the 1,775-mile long line from Omaha to Sacramento, traversing plains, foothills, and mountains, all of

the problems of railroad location would be encountered. Studies would have to be made of ridge and valley lines, of passes, and tunnels; practical locations determined for the short-span bridges, mostly of timber, that were then feasible. Skillful reconnaissance would be required to find answers to difficult questions. Would it be at all possible to find a path which could be laid out within the limits of allowable curves and grades? What would the railroad cost? Would the huge expense be justified by the explorers' reports on the resources of the country to be served — the resources of gold, silver, lead, and timber, not to mention the agriculture to be developed naturally or with the aid of irrigation? From Omaha west for several hundred miles, it would, obviously, be good judgment for railroad curves and grades to conform to the trail used for centuries by buffaloes and Indian tribes, and via which Mormon emigrants had made their heroic trek to the West, that is, along a section of the famous Oregon Trail. Today, Route 30, the Lincoln Highway, parallels this early trail for many miles.

In 1857 a report of the War Department was issued, which was entitled "Explorations for a Railroad Route from the Mississippi River to the Pacific." Jefferson Davis, as Secretary of War, signed this monumental report, which compared the merits of several railroad routes. Handsomely illustrated, and with many maps, this 11-volume document recorded the results of exhaustive explorations of plains, mountains, and desert areas of the regions explored; it gave extensive data on meteorological conditions, plant life, and beasts — bison, antelope, and elk, which were to be shot at from the car windows of the completed Pacific Railroads 12 years later. The names of army lieutenants and captains, who became high-ranking officers in the ensuing Civil War,



Plan and profile maps of the western part of the United States give a thoroughly inadequate impression of the difficulty and magnitude of the task of joining Omaha and Sacramento by rail at Promontory Point in 1869.



Beyond the Mississippi

Surveying the routes for transcontinental railroad lines was no easy task as this party in Humboldt Pass indicates. Chief Engineer Judah of the Central Pacific estimated that reconnaissance surveys for a transcontinental railroad would cost \$200,000. His estimate mentions transit shots 1,000 feet long, with angles turned by goniometer. Levelers would set benches at about one-mile intervals which check-levelers would verify. Each party would have two hunters, at \$40 per month, to supply meat. Horses for transport would cost \$100 each.

appear in this report. Captain George B. McClellan's report¹ on existing railroad standards was highly commended by Jefferson Davis, the future President of the Confederacy, praising the ability of the man who was soon to command the Union Army of the Potomac. It was only natural that Jefferson Davis should heartily endorse the route of the 32d parallel, the most southerly of the surveyed locations.

Field Day for Lobbyists

The Great West was that part of the United States to the west of the Mississippi River. To all Americans and to hordes of Irish and German immigrants, the Great West offered adventure and riches. Gold and silver awaited the adventurous. For more sober people, the Homestead Act of 1862 offered great farms; there were timber, and vast areas for the grazing of cattle and sheep. Drawn by oxen and mules, trains of wagons, frequently one quarter of a mile in length, had borne thousands to the fabulous regions of the Great West. Checking off their

¹ Shortly, McClellan was to become president of the Illinois Central Railroad and attain a high reputation in this position. A little later, early in the Civil War, he was to be appointed commander of the Union Army of the Potomac by President Lincoln. His qualifications for the earlier position are well verified by his comprehensive report on the Pacific Railroads from which later quotations will be made. As to the latter post, historians quite universally rate him as a discredited military commander; but the record shows him to have been a good railroad engineer.

daily progress of from 12 to 20 miles per day, the emigrants prayed for a railroad along this road to fortune.

As a war measure, the first Pacific Railroad Act was passed in 1862, to foster the loyalty of the western territories in the Civil War. The Congress of 1862 was in an economical mood; it was frightened by a national debt which two years of war had multiplied by three. Its land and bond grants were inadequate for the tremendously speculative venture which presented apparently insurmountable difficulties of construction — a railroad, across hostile territory. Private capital just wasn't interested.

Railroad lobbyists flocked to Washington to convince Congress of this undoubtedly true condition. The lobbyists were persuasive. The next — more generous — Congress, now acclimated to the inflationary atmosphere of a national debt of about \$1,600,000,000 passed the supplementary Act of 1864, the grants of which proved much more attractive to private capital. This and other acts gave grants in land and United States bonds to the railroads as follows:

- (a) Land grants of 10 alternate sections per mile, on each side of the line, which averaged 12,800 acres per mile.
 - (b) \$16,000 per mile between the Missouri River and the east base of the Rocky Mountains, and from the Sierras to Sacramento.
 - (c) \$32,000 per mile from the Rocky Mountains across the Great Basin.
 - (d) \$48,000 per mile across the Rocky Mountains and the Sierra Nevadas.

The Pacific Railroads were built in what has been well called the Tragic Era of American political life. Speculation was rampant and graft was common. A somber highlight of this era was the Credit Mobilier scandal, involving the promoters of the Pacific Railroads. Inquisitive persons, noting the huge gifts to the railroads, wondered how much the railroads had given to the members of Congress, including a future vice-president of the United States.

Two main railroad arteries were in existence from the East Coast: the upper line to Chicago, to be extended by three proposed lines across Iowa, which would converge on Council Bluffs, and the lower line to St. Louis. Pro-

TABLE I—HISTORICAL PARALLELS

<i>Pacific Railroads</i>			<i>Contemporary American Events</i>
Organization of Central Pacific RR of California	July 1861	Fort Sumter	Apr. 1861
First Pacific Railroad Act	July 1862	Naval battle of Monitor and Merrimac	Mar. 1862
Central Pacific RR broke ground	Jan. 1863	Emancipation Proclamation	Jan. 1863
Union Pacific RR broke ground	Dec. 1863	Gettysburg	July 1863
Second Pacific Railroad Act	July 1864	Early's raid on Washington (Confederates within six miles of Capitol)	July 1864
Central Pacific RR reached Auburn (36 miles)	May 1865	Appomattox	Apr. 1865
<i>Postwar</i>			
Union Pacific RR had laid 40 miles of track from Omaha	Jan. 1866	Atlantic cable (first successful)	July 1866
Union Pacific RR had laid 305 miles of track (beyond North Platte)	Jan. 1867	Purchase of Alaska from Russia	Mar. 1867
Central Pacific RR reached Sierra Summit (105 miles)	Sept. 1867		
Union Pacific RR had laid 540 miles of track (between Cheyenne and Laramie)	Jan. 1868	President Andrew Johnson impeached (acquitted)	Feb. 1868
Railroads met at Promontory Point	May 1869	President Grant inaugurated	Mar. 1869
Missouri River Bridge at Omaha completed, making a complete railroad line across the continent	Feb. 1872	The Great Chicago Fire The Great Boston Fire	Oct. 1871 Nov. 1872

motion was by three groups of financial interests, representing:

(a) *The Central Pacific Railroad Company.* This railroad was to build east from Sacramento, to cross the Sierra Nevada Mountains and end near the Great Salt Lake;

(b) *The Union Pacific Railroad.* Fostered by Chicago interests and having close bonds with a financial group styled the Credit Mobilier of America, the U. P. was to build west from Omaha, and join the Central Pacific at Great Salt Lake;

(c) *The Kansas Company.* This St. Louis group sought to beat the Union Pacific by building the Leavenworth, Pawnee, and Western Railroad to the 100th meridian, and thus be legally designated as the eastern section of the transcontinental line. Internal dissensions in this company soon caused it to give up this attempt.

Construction Standards

American railroads had passed through their infancy² and had reached a stage of development in roadbed and rolling-stock standards very similar to that of the present time. Instead of individual stone blocks for supports and continuous strap rails on squared timber, inverted iron tee rails on wooden cross ties were now preferred. Cut and fill could be computed by Professor W. M. Gillespie's tables, not too different from modern ones. The need for adequate waterways at culverts and bridges to care for floods was recognized. Thick, well-drained ballast was considered necessary. The outer rail on curves was elevated according to definite tables, to give one indication of the status of railroad design of the period. Wrought-iron chairs under the rail joints were being supplanted by fishplate joints. Axles were fixed to, and turned with, the flanged wheels as at present, and this was recognized as a reason for the additional power needed on curves.

The Pacific Railroad Act allowed curves as sharp as those on certain sections of the Baltimore and Ohio Railroad (400-foot radius), but such curves were limited to the mountainous regions, in recognition of the "evils of curves." Likewise, although allowed by the Pacific Railroad Acts, grades as steep as the Baltimore and Ohio maximum of 116 feet per mile were restricted and the tracks were kept as near level as possible. The advantages of the undulating railroad were now admitted to be fallacious; it was agreed that a train could not gain

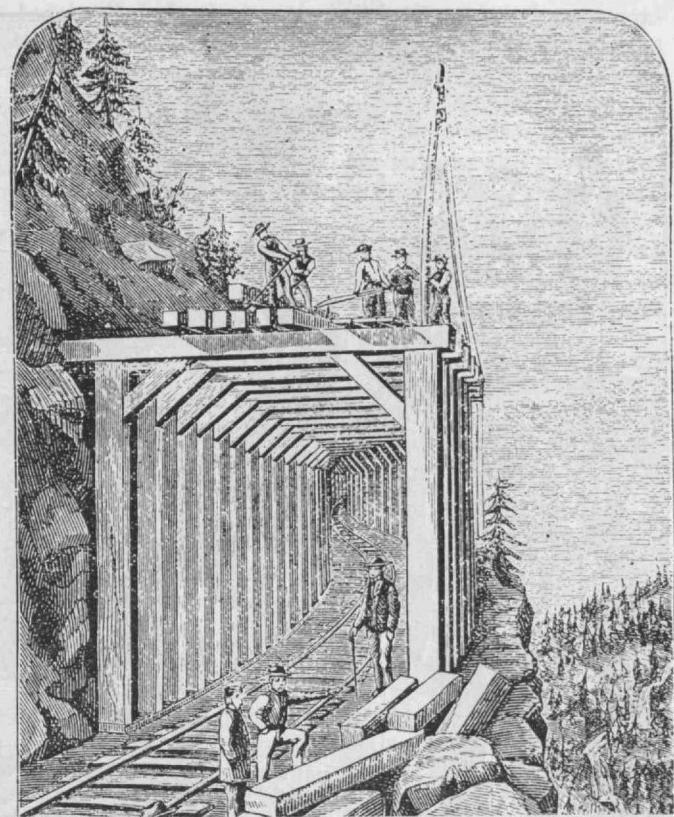
TABLE II—COMPARISON OF STEAM LOCOMOTIVE CHARACTERISTICS

Characteristic	1875 Baldwin 10-wheel	1941 * Union Pacific 4-6-6-4 Freight
Date built	About 1875	1937
Weight of locomotive in pounds, excluding tender	78,000	582,000
Number of drivers	6	12
Diameter of drivers	54"	69"
Total number of wheels, excluding tender	10	20
Wheel base, excluding tender	23' 6"	59' 11"
Cylinders		
Number	2	4
Diameter	18"	22"
Stroke	24"	32"
Grate area, square feet	14.4	108.2
Total heating surface, square feet	1,108	5,381
Total weight in pounds on driving wheels	58,000	403,000

Note: 1875 data from Forney's *Catechism of the Locomotive*, 1875 edition. 1941 data from Mark's *Mechanical Engineers' Handbook*, 1941 edition.

* The dimensions and power of a modern steam locomotive have been well summarized. "As a self-contained power plant, it has no rival—100 feet long, 15 feet high by 12 feet wide and producing 7,000 cylinder horsepower." (H. A. F. Campbell, '99, *The Technology Review*, June, 1947.)

² The early growth of railroads in the United States is readily evident when it is recalled that in 1830 only 23 miles of railroads were in operation. By 1868, however, the corresponding figure was 42,255 miles.



Marvels of the New West

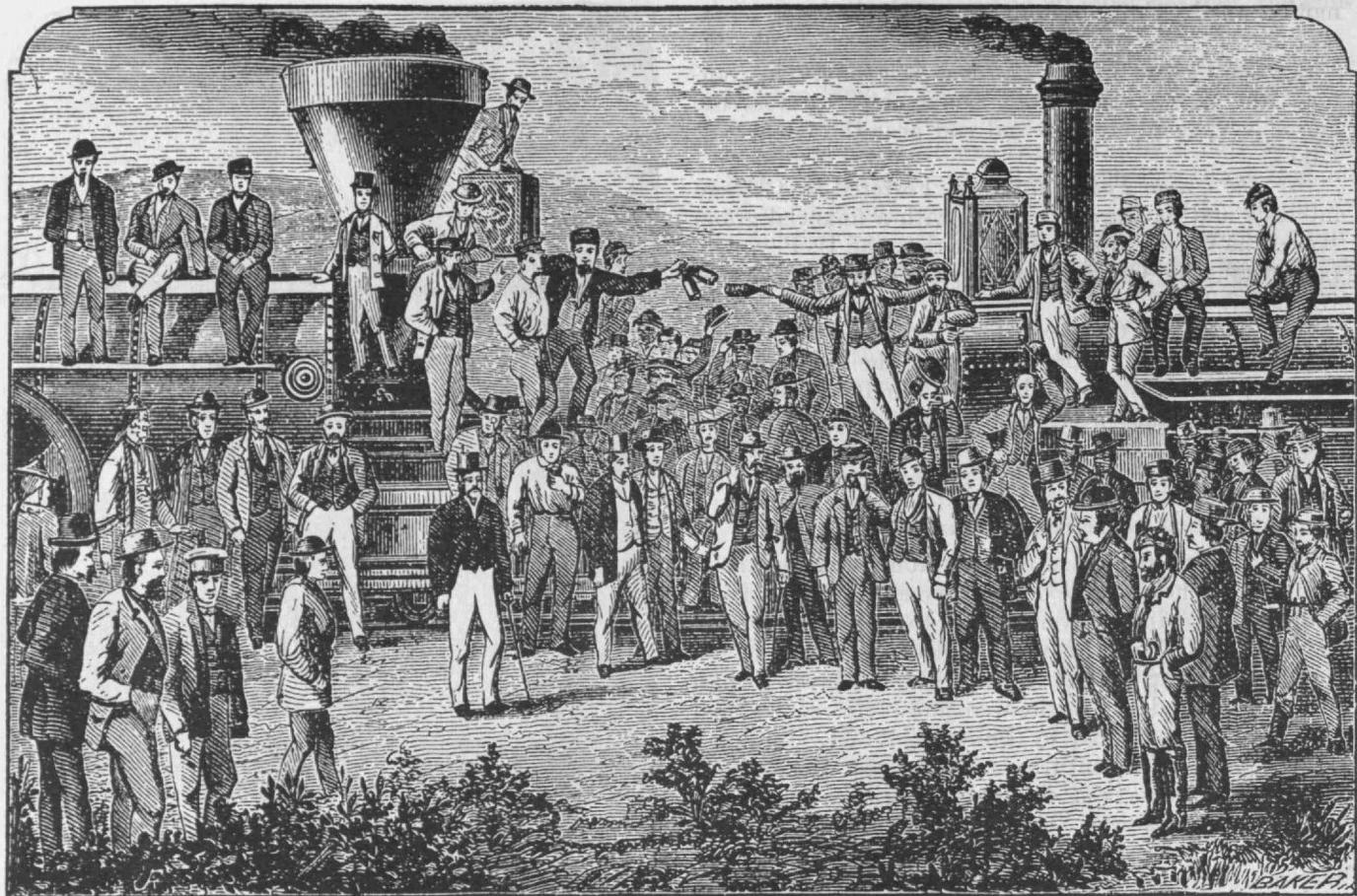
In a distance of 40 miles in the Sierras, 32 miles of snow structures were built by the Central Pacific Railroad. The gallery type, shown here, was built alongside the mountain and was designed to withstand the impact of snow slide. The shed type was designed to carry the weight of a level snowdrift on its roof. That such loads were considerable may be judged from the fact that one such drift measured 50 feet deep. Fire hazard was high since snow sheds were built entirely of wood.

enough momentum going down one hill to carry it up the next, and so to keep running forever.

Locomotives and cars were tiny prototypes of those of today. The mean effective pressure throughout the stroke was checked by a steam engine indicator, which drew a diagram like a modern one. There were steam tables up to 300 psi (absolute), coal analyses were tabulated much like the present standards, and there were steam domes, safety valves, and sand tanks. In Massachusetts, the McClellan Report stated, engines usually carried a pressure of 100 pounds in the boiler; the strength of the boiler was from 350 to 500 pounds (the designation "psi" is not given, but may be presumed). McClellan referred to the possibility of condensing the exhaust steam, and cited an example of this practice in Scotland. He reported that four- to seven-car trains of the Boston and Maine Railroad traveled at a speed from 24 to 34 miles per hour.

A most expedient report was submitted by a board of the Corps of Engineers, United States Army, on standards for the construction of the Pacific Railroads in 1866. Faithfully, this report collected data on American railroad standards. Rigidly, the report adhered to the suggestive "should be," rather than the mandatory "shall be." No standard, it implied, should be allowed to interfere with speedy completion, an admonition that was taken in earnest, as the size of the later "Deficiencies of Construction" account made apparent.

Cross ties of oak or other suitable material should be used where such ties could be obtained with reasonable



Marvels of the New West

At Promontory Point, near Ogden City, Utah, 1,775 miles of railroad were joined on May 10, 1869. Some of the celebrations of the "Last Spike Ceremonies" are recorded in this woodcut engraving probably cut from a photograph made on the occasion. The last spikes included one of gold from California, one of silver from Nevada, and one of gold, silver, and iron from Arizona. A solid silver hammer was wired into telegraph circuits to ring bells in San Francisco and to telegraph news of the completed rail line to Baltimore, Philadelphia, Boston, New York, Cincinnati, and Chicago. The silver-plated tie of California laurel was then removed and was replaced by a pine tie for the relic hunters to splinter.

Several replacements were used up in quick succession.

transportation. But, if cottonwood or similar soft material were used, the ties must be burnettized (zinc treated). There should be at least 2,400 ties per mile although the eastern practice was said to be 1,700 ties per mile. Rails must be of American iron, because the Act said so, and should weigh 60 pounds per yard; but rails as light as 50 pounds were allowed. As the nearest approximation to a continuous rail, the so-called fish joint was preferred, but, if this would retard the progress of the work, the common American wrought-iron chair could be used. Sidings totaling at least six per cent of the length of the line should be laid for we must remember that the original transcontinental line was a single track railroad. Cattle guards and road crossings were called for.

This reasonable specification, conceding so much to the speed of construction, still resulted in the building of a good railroad. While many improvements were later required, contemporary and later inspections commended the unusually well-selected location of the line and the faithfulness of construction. If revised to call for today's much heavier rails and rolling stock, the specification might serve for a modern railroad.

Battle Prodigious

Abraham Lincoln, former surveyor, made a wrong decision in a dispute regarding the gauge to be adopted on

the Pacific Railroads.³ The California charter, under which the Central Pacific started its line, called for a gauge of five feet. Obligingly, Lincoln decreed that this gauge should be followed throughout. An Act of Congress was required to allow construction of roadbeds with the narrower gauge of four feet, eight and one-half inches which had recently been adopted by several large American railroads and which is today adopted throughout the United States.

It was natural that General Dodge should adopt a semi-military organization for his construction force which built the Union Pacific Railroad westward from Omaha. It was unusual that Charles Crocker, small dry goods merchant turned railroad construction superintendent, should exhibit the bold, organizing genius that was called upon to meet the difficult problems involved in the building of the Central Pacific Railroad from Sacramento easterly. Audacious means were adopted by both railroads to organize their huge construction forces, to obtain the vast quantities of materials, from remote sources of manufacture, and to deliver them to the ever

³ Lincoln's name appears frequently in the railroad story. His nomination for president was strongly backed by railroad promoters; as president he selected its eastern terminus (Council Bluffs, as later confirmed by the Supreme Court); he advocated the amendment of the first Act, and he was quoted as saying that the proudest event of his life had been the signing of the bill in aid of the Pacific Railroads.

receding "end of track."⁴ Before keeping his promise to become chief engineer of the Union Pacific, Dodge remained in the Army long enough to organize the campaign that was to curb the Indians sufficiently to allow construction to go on. The record of massacre of troops, settlers, and railroad builders in the Indian Wars immediately after the Civil War is still somber reading.

For the Central Pacific, all rolling stock, and all construction material except timber and stone, had to travel on vessels, via Cape Horn, or by transfer across the Isthmus of Panama. With materials ordered a year ahead, prices were fantastic, and heavy freight rates were enhanced by war risk. Engines arrived knocked-down at San Francisco, were shipped by lighter and boat to Sacramento, and assembled there. A similar situation existed for the Union Pacific at the start. Rolling stock, rails, and ties for the treeless miles of Nebraska had to be transported by wagons or boats, for the railroad system from Omaha to the eastern states still lacked tracks for a long stretch across Iowa.

For the Central Pacific the labor shortage caused by the Civil War was made more acute by the natural desire of workers to make \$4.00 a day at the mines as against \$1.00 to \$2.00 on the railroad. Superintendent Crocker met this difficulty by calling for Chinese coolies. On the Union Pacific, however, there were many Civil War veterans available by the time construction really started. Almost every railroad worker on this line was an ex-soldier, Union or Confederate, according to one account.

A few months after the breaking of ground by the Central Pacific, its first chief engineer, Theodore Dehone

⁴ Those who struggle with the present huge volumes of the Poor and Moody's series of financial manuals would find much easier to handle the little *Manual of the Railroad of the United States, 1869-70*, by Henry V. Poor. One hundred pages of advertising, spotted with fine woodcuts, reveal how old are so many of today's items of railroad equipment. Early frogs, safety valves, and snow plows are illustrated, as well as devices representing embryonic attempts to solve such problems as the proper joints in rails, and car heating. Timber and steel bridges, locomotives, and cars of all sorts are displayed as are also shop equipment and tools for building railroads in the field. Automatic couplings are described but the reader would need to turn to the contemporary *Catechism of the Locomotive* of Forney for a complete description of the air brake and the steam engine indicator.

While the problem of delivering this material was tremendously difficult, the supply of railroad rolling stock and track equipment was ample for the huge orders of both the Union Pacific and the Central Pacific.

Judah, died. In the location of the line his influence continued after his death. His outstanding contribution was the determination of the route of the Sierra crossing, as ascertained by his personal surveys. As they had built their roads for generations, and their railroads for decades, engineers had followed the streams and rivers, that is, they had kept to the valleys. For the steep slopes of the Sierras, such a course would be blocked by almost vertical, granite cliffs; tunnels of dimensions to pierce such an obstacle were then impracticable. Judah's solution to this dilemma was as simple as it was effective, for the Central Pacific line followed the ridges. In Judah's words: "The line on top or crest of ridge being far from uniform, of course the lowest points or gaps in ridge become commanding points, and it was found necessary to carry the line from gap to gap, passing around the intervening hills, upon their side slopes." The route, with its steep grades, would cross the Sierras in the vicinity of Cascade and Summit, at an elevation of slightly over 7,000 feet. The men who were making millions yearly from their stage and wagon lines to the mines of Nevada called Judah's route the "Dutch Flats Swindle," and said that it would end high in the air and be a waste of money.

To get down to normal terrain once the Sierras were crossed, the Judah plan would now adopt the standard procedure of following a valley, that of the Truckee River. The railroad should follow the Humboldt River, in Nevada, and thence to Utah. Climate and terrain combined to make the Central Pacific a frightfully difficult line to construct. Snow drifted in banks to the unbelievable depth of 60 feet, and snow tunnels were needed to reach the face of rock tunnels. At one time 5,000 men were employed in shoveling snow; they made excavations in snow caves, with the spoil passed out through shafts of snow. In the cutting of 15 tunnels, including the Summit Tunnel, one-third of a mile long, gunpowder and even nitroglycerine (an early experience) were used. A force of 11,000 Orientals, 2,500 Caucasians, and 1,000 teams of horses were at work. Such are highlights in the story of the building of the line of the Central Pacific Railroad. What of the Union Pacific?

A figure of legendary proportion in the saga of the Union Pacific Railroad was General Jack Casement. General Jack is said to have marched his men to the job in military formation; they would (*Continued on page 278*)



During the construction of the transcontinental railroads Indian attacks, such as this of the Cheyenne Indians on a working party of the Union Pacific Railroad were not uncommon. Chiefs of survey parties and road laborers were among the hundreds killed during the construction of the railroads.

Food, Fuel, and Faith

*The War Proved Soundness of the American Way of Life.
Great Strength and Enormous Reserves of Power
Come from a Nation's Free People.*

BY KARL T. COMPTON

COMMENCEMENT ADDRESS

GRADUATION is a very significant event. It is worth our while to spend a few minutes to recall what it really means. Classes come and classes go with what sometimes may seem, in the history of the college community, the monotonous regularity of a railroad schedule. But each class has its individuality, and is made up of individuals, for each of whom this ceremony is the climax of that first period of life which is devoted to three things: development of a healthy body, development of a trained mind, and development of a sound character. This body, mind, and character are the foundations for the work and play, the achievements and satisfactions, to which the rest of life is devoted.

Throughout the years tens of thousands of public-spirited persons, actuated by generous affection for young people and by faith in the value of education to our society, have contributed the funds which have created the endowment and the physical plant of M.I.T. Our government has granted tax exemption to aid this worthy cause of education and, grateful for the services and sacrifices which so many of you made for your country in World War II, has assisted many of you financially to secure this education. More than a thousand staff members of this institution have devoted themselves to help you secure it.

In some 500 homes your graduation today is the cause of deep satisfaction and the realization of long-nourished hopes, and many sacrifices. I was made to realize this on the occasion of my own graduation when my father, in a rare burst of emotion, said to me: "My son, this is the proudest day of my life." This feeling is in many hearts today.

Yes, your graduation is an event of real significance. You have worked hard and successfully. Your training is of unexcelled quality. Your future is before you. On behalf of the Corporation and Faculty of this institution I congratulate you.

My parting message to you concerns this future, and the conditions you will meet as you enter it. As a text, I have taken the words by which a distinguished general recently epitomized the needs of the war-ravished countries of Europe. "These people need," he said, "food, fuel and faith; but most of all they need faith." For without some basis for faith in their future, food and fuel will only postpone their disintegration. I should like to make two applications of this text: first to the United States as a nation, and second to each one of you individually, whether you are citizens of the United States or guest students from some other country.

Food and fuel may be taken to symbolize the necessities and comforts of life. Of these, our country is blessed with

an abundance surpassing any other people in history or any other nation in the world today. This is partly due to the richness of our natural resources of fertile agricultural land, of minerals and fuel, of forests, rivers and lakes, of temperate climate. It is partly due to the inherited pioneering spirit and the virile admixture of the sturdy stock of many nations. It is partly due to a heritage of freedom, won and preserved by struggle and sacrifice, in which there has been great opportunity for free initiative by which each person has the chance to follow a career of his own choosing. The limits of his success are set by his own ability and by the free competition of his fellows, but not by traditional class distinctions or by governmental regulations.

Under these conditions we have achieved a standard of living which is the envy of the world. Our natural resources have been exploited by unprecedented technological methods to multiply by many fold the traditional per capita productive power. We produce more, and have more, with less work. To be sure, we have our problems, but they are problems of distribution and planning and management — not problems of national poverty. They are problems of wise conservation as opposed to extravagant waste, of future technological development rather than present scarcity, of maintaining our free enterprise system against the mass pressure of minority groups seeking selfish advantage by coercion or political lobbying rather than by virtue of their productive contribution to the general economy. But we have the basic resources, the basic skills, and the momentum of progress to insure food and fuel, and all the other factors which constitute the necessities and the comforts of life, and a reasonable lot even of luxuries.

With your technological training, you will be well prepared to make your contributions to this program of production — to maintain it, to raise it to still higher standards of efficiency, and to make the modifications required by new demands and changing conditions; and if past experience is any guide, these demands and opportunities will be great during the period of your active careers.

But turn now to the subject of faith, for without faith, food and fuel cannot make a great and strong nation. Are we in danger of becoming like the man who gained the whole world but lost his own soul? Let us look at the evidence.

I have presented part of the evidence. We have achieved a standard of living, based on technological developments in industry and agriculture, which far surpasses that of any other nation in history. When we became involved in World War II, we rallied to meet the crisis in astonishing strength. (*Continued on page 288*)

Psychology, Men, and Machines

*Design and Effectiveness of Control Mechanisms.
Materially Improved by Contributions
of Psychologists*

BY W. MACK ANGAS

THE pilot, copilot, and navigator of a large naval seaplane were being briefed for a long overseas reconnaissance. The flight engineer of the plane was called in to hear a final summary of the instructions and advice given by the squadron commander.

"The take-off from the atoll where you are to pick up Lieutenant Commander Maley and his party of Seabee surveyors will be the toughest spot in your trip. With their equipment, they'll load the plane heavily. As you see," and he pointed to a chart, "you can't get a run of more than two miles in the lagoon."

"How about taking off from the open sea?" asked the copilot.

"I don't advise it. There'll be a long swell that may get you into serious trouble. Of course you'll consult Maley as to the best water for your take-off run. He and his party have been surveying the lagoon."

"Has he any aviation gas with his outfit that we can pick up at the atoll?" asked the flight engineer who knew that the survey party had gone out by ship with the intention of flying back when their field work had been completed.

"Unfortunately not! And you'll have none too much for the long hop from there to Kwajalein. Keep a close check on your 'points of no return' throughout the trip, and especially on that hop. And let me repeat my caution about the predawn take-off from the lagoon. It's going to be the toughest spot in a tough flight."

On the following morning, the crew of the big Martin Mariner prepared for this take-off. Carefully the officers and men of the big flying boat went over their checkoff lists to make sure that everything was as it should be before they started. A few minutes later, the roar of the plane's two big engines announced the start of the take-off run. The roar became higher in pitch, and then instruments indicated that the hull had left the water and the 20-ton plane was nosing up into the blue-black sky of a tropic night. They could see practically nothing ahead and must trust their instruments.

All went well until, with only 50 feet altitude, the mounting roar of the two engines faltered and the flight engineer sensed a sudden loss of acceleration. Galvanized into action, he frantically checked the many gauges, dials, lights, and control settings on the panel before him. That telltale red light! He hadn't seen it and it meant a dangerously low fuel level in his forward tanks! A quick switch to the center hull tank, a furious operation of the wobble pump, and the engines resumed their steady, full-voiced roar. But now the pilot had to make an instantaneous decision. Should he continue his flight and hope to regain the precious lost altitude, or try to get back down onto the water in the dark? He elected to go

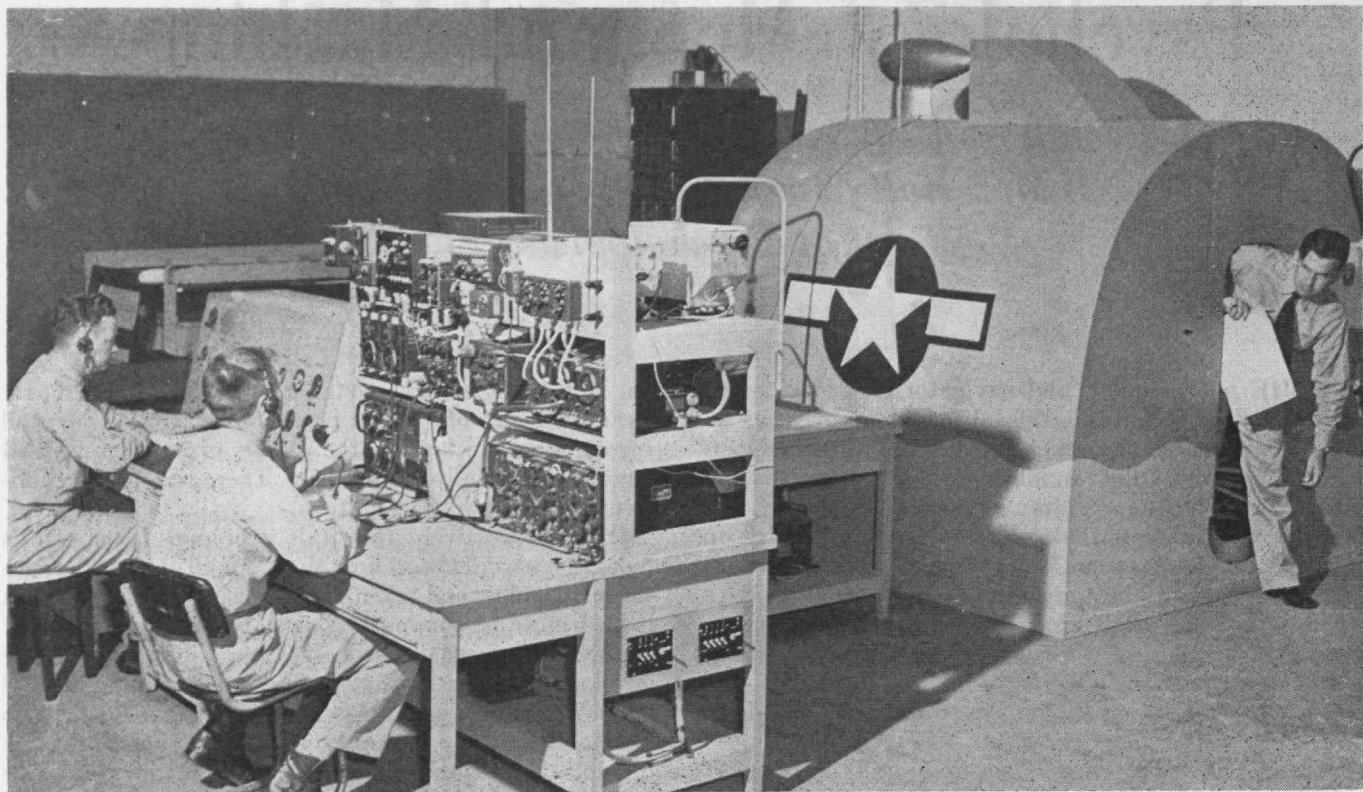
on. But there wasn't enough room! They could never clear the fringe of coconut palms on the rim of the atoll surrounding the lagoon, the details of which they had studied so carefully on the chart. There was neither sufficient altitude nor space to turn.

Oh, well! Next time they'd do it properly! And what's more, there would be a "next time" for all of them because the whole affair had taken place, not in a seaplane over a palm-fringed lagoon in the Pacific, but in a laboratory of the Navy's Special Devices Center. Here the Navy develops and tests training devices which simulate actual operating conditions so closely that students learn to do the right thing in common types of emergency from force of habit. In fact, the utilization of training devices of this type to indoctrinate pilots in the use of new techniques and instruments, such as ground control approach, instrument landing systems, and radar should materially reduce the hazards of flying by transmuting many present-day emergencies into mere incidents.

The development of training devices that simulate



The student flight engineer, seated at the control panel shown here, undergoes all experiences of handling the motors of a Martin Mariner in various types of emergency except that of danger. When undergoing training, he sees dial readings as they would appear in an actual operation of the plane, and even hears the characteristic sound of the motors under various conditions through a loud-speaker system.



The hut which a student officer is leaving is the navigator's hut, and contains all the navigational equipment of a large plane. In it the student navigator may have practically all of the experiences of navigating a patrol plane on a long flight.

actual operating experience so completely as to include the reproduction of characteristic sounds through loud speakers is, however, only one of the functions of the Center. Here in laboratories and offices located at Sands Point, Long Island, the Navy plans, directs, and partially executes its program of applying the knowledge of the psychologist and physiologist to the many engineering problems to which such knowledge is applicable. These problems are varied in character. One deals with designing and arranging the control mechanism of machines and instruments so as to minimize the operator's burden. A closely allied problem involves the development of techniques by which operators can use existing types of control gear with increased effectiveness and decreased fatigue. A third question of great importance is determination of the limitations of operators' tolerances. What accelerations, for example, can dive-bomber pilots stand in pull-outs and how much oxygen must an interceptor pilot take during a sustained flight at an altitude of 20,000 feet in order that his judgment may not be impaired by oxygen deficiency? Of these problems, the one involving the design of control gear is perhaps of the greatest immediate importance.

The problem of designing control gear so as to minimize the difficulty of the operator's job is not a new one, and reasonably satisfactory solutions of it were long ago developed in certain fields by the evolutionary process of trial and error. For example, the console of a large pipe organ with its superimposed keyboards, pedals, and stops, forms an almost perfect control system by means of which a single operator can handle an extremely complicated machine by effectively using both hands and feet. That the mechanism produces nothing more than sound, does not in any way lessen the interest of the designing engineer in the console as an outstanding example of the effec-

tive arrangement of the controls of an exceedingly intricate mechanism. In fact, one's admiration for the skill of a fine organist may well be matched by admiration for the skill of the organ builder who placed, within reach of a single musician, the control of valves admitting air to as many as 30,000 pipes.

The standard keyboard of the typewriter affords another good example of an effective control arrangement that has been developed by an evolutionary process. The arrangement of the keyboard could be improved although any change would be a handicap to typists skilled in the use of the present keyboard.

On the other hand, the process of evolution has made poor progress in other less familiar fields than the development of the organ console and the typewriter. The navigator's sextant, for example, superseding Hadley's octant on which it was based, is an instrument the essential left-handedness of which was not realized until aviators began to use it about two centuries after its prototype was invented. It would be interesting to know whether or not Hadley was, in fact, left-handed, for he built his sextant to be held in the right hand while the left hand is called upon to operate its clamp and tangent screw. Not only does this call upon the left hand to do a job requiring a certain amount of dexterity, but it makes it impossible for a right-handed navigator to pick up a pencil and record the reading of his sextant without first putting the instrument down. Navigators of surface vessels overcame this difficulty by employing an assistant to record their observations; an expedient which is impracticable, if not impossible, in an airplane. Therefore, when progressive navigators, such as Weems, took up the problem of applying nautical astronomy to aerial navigation, they developed sextants that are held in the left hand and operated by the right one which is available for

making notes when not actually manipulating the controls of the instrument.

The operators of such widely differing devices as sextants, typewriters, and pipe organs have, however, one thing in common. They work almost exclusively by sense of touch in accordance with directions obtained visually from a conveniently located source. The design of the control mechanisms of such devices, therefore, resolves itself fundamentally into the problem of arranging the necessary knobs, keys, and stops in such a way that all may be reached readily. Those more frequently used should, of course, be in positions accessible for operation by the more easily trained, and therefore more capable, hands or fingers.

The design of the control and instrument panel of an airplane is essentially a more complex problem involving not only the convenient arrangement of the control gear, but also the co-ordination of this gear with the arrangement of the means by which the operator receives essential information. For the pilot of a plane obtains information not only visually, but also by sound and by the feel of the controls. Furthermore, some of the information obtained visually is, under normal conditions, secured from outside the plane through the cockpit windshield and windows, while some comes from gauges and dials mounted on the instrument panel. But the onset of instrument weather denies the pilot practically all information obtained visually through the cockpit windows and requires him to substitute for it additional information secured from the instrument panel. This at once confronts the designer with the necessity of so arranging a large number of instruments that the pilot can see them effectively out of the corner of his eye while he is either looking ahead through the cockpit windows or has his eyes focused primarily on the artificial horizon and other items of equipment used in blind flying. Then, too, the various control levers, buttons, and handles must be arranged so that essential ones can be readily reached by

both the pilot and copilot and all of them can be manipulated by the two men working as a team. At the same time there may be no wide deviations from arrangements of control gear and instruments that have been accepted as more or less standard.

Research at Sands Point has shown that the first step in the solution of such a problem is to decide upon what items of information are really necessary to the operator and to eliminate gauges and dials that, by giving non-essential information, tend to confuse rather than assist him. That such an obvious conclusion has not been generally appreciated in the past is surprising, but nevertheless true. The next step is to arrange essential instruments so that a quick glance will tell the operator whether or not "all's well." It is rarely necessary for a pilot to know the exact readings of pressure gauges, ammeters and voltmeters, but it is vital that he be able to tell at a glance whether or not the readings of a number of such instruments are within the upper and lower limits of safety. This may be achieved by arranging dial gauges so that their most desirable readings are indicated by some easily recognized position of the pointers, such as vertical, and that trouble or danger is indicated on all gauges by some easily recognized angle with the vertical, such as 45 degrees. An arrangement that has (*Concluded on page 276*)



A student officer at Sands Point solving problems of navigating a large plane on a long flight. The instruments he uses and the conditions under which he works closely simulate those actually experienced in a patrol plane making an overseas reconnaissance.

Spectral Devices Division, Bureau of Aeronautics

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Campaign Oratory

BALLOTS will soon be mailed to members of the Alumni Association of M.I.T. to elect new officers and representatives of the Association. Nominee for the presidency of the Association for the coming year, to be elected this spring, is C. George Dandrow, '22, IX-B, Vice-president and General Sales Manager, Industrial Products Division, Johns-Manville Sales Corporation, New York City.

The National Nominating Committee — consisting of Robert S. Williams, '02, chairman, Ralph C. Robinson, '01, Fred W. Morrill, '07, Gordon G. Holbrook, '10, Irving W. Wilson, '11, Jonathan A. Noyes, '12, Robert C. Erb, '17, Charles A. Williams, '21, Henry C. Gunning, '26, and Stephen L. Macdonald, '39 — has also nominated Orville B. Denison, '11, VI, Chamber of Commerce, Gardner, Mass., to serve as vice-president for two years. Nominees for election to posts on the Executive Committee for two-year terms are: Allen Latham, Jr., '30, II, Arthur D. Little, Inc., Cambridge, Mass., and Hugh S. Ferguson, '23, XV, Dewey and Almy Chemical Company, Cambridge.

Named for alumni term membership on the Corporation of the Institute to serve for five years are: Raymond H. Blanchard, '17, X, Vice-president and Director of the Hood Rubber Company, Watertown, Mass.; Thomas D'A. Brophy, '16, IV, President, Kenyon and Eckhardt, Inc., New York City; and Thomas H. West, 3d, '22, II, President, Draper Corporation, Hopedale, Mass.

New representatives on the National Nominating Committee to be elected this year (one from each district) are: *District 3* — Springfield Club, Minot R. Edwards, '22, XV; Pittsfield Club, Harry Kalker, '23, I; *District 6* — Washington Club, Aubrey D. Beidelman, '15, XIII; Richmond Club, John S. Williams, Jr., '22, XV; Charleston Club, Irvin L. Murray, '26; *District 7* — Indianapolis Club, Thomas G. Harvey, '28, III; Duluth Club, Arthur C. Josephs, '28, I; Louisville Club, Elmer A. Skonberg, '29, XV.

FOR PRESIDENT

... of the Alumni Association, C. George Dandrow, '22, IX-B, has been nominated for election for the coming year. Mr. Dandrow prepared for M.I.T. at the Boston English High School and after graduating from the Institute was employed by the Johns-Manville Sales Corporation in Boston. After five years he transferred to the general engineering staff at the company's headquarters in New York. In 1930 he was named staff manager to handle the company's products for pulp, paper, lumber, and the textile industries. In 1931 he was promoted to sales manager, and in 1936 he became New York district manager. He became vice-president and general sales manager, Industrial Products Division, on January 1, 1946. In 1947 Mr. Dandrow was elected to serve as alumni term member of the M.I.T. Corporation for a five-year period. He is serving as vice-president of the Alumni Association for the term 1946-1948. Mr. Dandrow has taken an active part in the activities of The M.I.T. Club of New York, and served as president from 1941 to 1946. In his professional field, Mr. Dandrow is a member of the American Society of Civil Engineers and also of the Engineers' Club of New York City. He is director of Junior Achievement, Inc. of New York, and treasurer and director of New York Building Congress.

Nuclear Science Administrator

MALCOLM M. HUBBARD, '29, has been appointed assistant director of the M.I.T. Laboratory for Nuclear Science and Engineering and will be responsible for administration, personnel, and supervision of design and engineering in the central shops. He will also supervise several experimental projects, according to a recent announcement by James R. Killian, Jr. '26, Vice-president of the Institute.

Mr. Hubbard was graduated from M.I.T. in 1929 with the degree of bachelor of science in electrical engineering. From 1929 to 1941 he was a member of the engineering staff of the Bell Telephone System, serving principally in New England. From 1933 to 1934 he was power supervisor of the Western Division of the New England Telephone and Telegraph Company.

In 1941 Mr. Hubbard was appointed a research associate in the Radiation Laboratory of M.I.T., and in 1942 he was made a group leader in the component engineering division. In 1945 he became associate head of the transmitter components division. He was then appointed to the Instrumentation Laboratory of the Institute, serving until 1946 when he joined the staff of the Laboratory for Nuclear Science and Engineering.

Mr. Hubbard is a member of the nucleonic committee of the American Institute of Electrical Engineers, and also a member of a similar committee of the Institute of Radio Engineers.





Photo by Fabian Bachrach

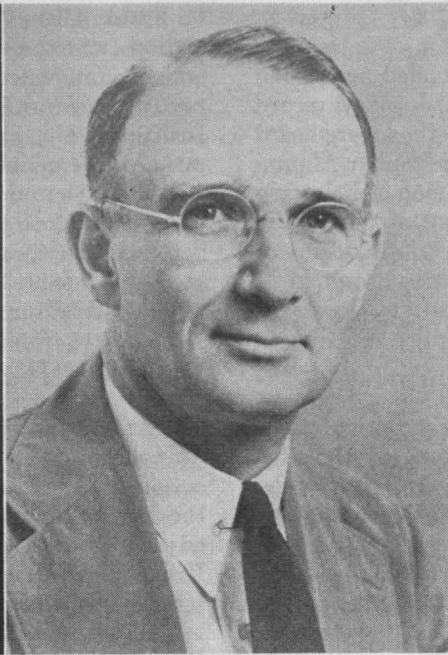


Photo by White Star

TO THE CORPORATION

... for a five-year term, as representatives of the Alumni Association, the National Nominating Committee has selected (left to right): Thomas D'A. Brophy, '16, IV, President of Kenyon and Eckhardt, Inc., New York City; Thomas H. West, 3d, '22, II, President of the Draper Corporation, Hopedale, Mass.; and Raymond H. Blanchard, '17, X, Vice-president in charge of manufacturing and Director of the Hood Rubber Company, Watertown, Mass.

K.T.C., C.B.E.

IN his recent appointment as an honorary commander of the civil division of the Order of the British Empire, President Karl T. Compton has received one of the highest honors the King can bestow on a civilian for extraordinary service. The honor was transmitted to Dr. Compton by Lord Inverchapel, British Ambassador to the United States, who notified him that King George made the appointment "in recognition of the valuable services . . . rendered to the Allied cause in various fields of scientific research and development."

In World War II, Dr. Compton had a leading role in directing the application of science to the war effort. He was a member of the War Resources Board from 1939 to 1940, and was appointed a member of the National Defense Research Committee of the Office of Scientific Research and Development in 1940, serving through 1945. In 1942 he served on the Baruch Rubber Survey Committee. Dr. Compton was chairman of the Radar Committee of the Joint Committee on New Weapons of the Joint Chiefs of Staff from 1942 to 1945, and he served during the same period on the advisory staff of the Chief of Ordnance Military Training.

In 1943 he went to England as chairman of the United States Radar Mission to the United Kingdom. His wide experience in organizing science for war led to his appointment in 1943 as chief of the Office of Field Service of the Office of Scientific Research and Development, a post which he held until 1945. From 1943 to 1944 he was special representative of Secretary of War in the Southwest Pacific Area, and he served as a member of the advisory board of the Army Specialized Training Division from 1943 to 1946. In 1944 Dr. Compton was appointed to the Committee on Post-War Research and Development of the Secretaries of War and Navy, and

from 1945 to 1946 he served on the advisory board of the Research and Development Branch of the Office of the Quartermaster General. He also served in 1945 on the advisory board of the Chemical Warfare Service and was a member of the Secretary of War's Special Advisory Committee on the Atomic Bomb.

In 1946 he was appointed by President Truman to be a member of the President's personal committee on the atomic bomb test, and he was also appointed a member of the Joint Chiefs of Staff Evaluation Board on the Atomic Bomb Tests, and more recently to membership on the Advisory Commission on Military Training. In 1945 Dr. Compton served as a director of the Pacific Branch of the Office of Scientific Research and Development and during that period was a member of the Scientific Intelligence Mission to Japan. He is also a member of the Naval Research Advisory Committee.

New Alumni

APPROXIMATELY 380 students received their degrees at commencement exercises held in Walker Memorial on the afternoon of February 4.

Commencement ceremonies for the Class of 2-48 began at 3:30 P.M. with an organ recital by Samuel Walter. The invocation was given by Everett M. Baker, Dean of Students. Diplomas were presented to the graduates by Karl T. Compton, President of the Institute, and John W. M. Bunker, Dean of the Graduate School.

The Review is pleased to publish (page 266) President Compton's address to the graduates "Food, Fuel, and Faith," and to welcome the graduates as new additions to the Alumni Association of M.I.T. Upon conclusion of the commencement exercises a president's reception for graduates and their relatives was held in Morss Hall.

Talking Turkey

TELEPHONE conversations that traveled more than 5,000 miles by microwaves to establish a new record for long-distance transmission by this method were heard by 800 M.I.T. Alumni during the Midwinter Alumni Meeting in Walker Memorial on the evening of February 7. Raymond H. Blanchard, '17, President of the M.I.T. Alumni Association, presided at the meeting and introduced the speakers: Dr. Karl T. Compton, President of the Institute; H. E. Lobdell, '17, Executive Vice-president of the Alumni Association; and George W. Gilman, '23, Director of Transmission Engineering at the Bell Telephone Laboratories in New York.

The record-breaking telephone conversation was the climax of a demonstration by engineers of the Bell Telephone Laboratories, as well as the American Telephone and Telegraph Company and the New England Telephone and Telegraph Company, of various types of long-distance radio telephone calls, which included communications with a vessel at sea, an automobile, and to Honolulu, Nantucket Island, and a ranch in a remote section of Colorado, near Cheyenne Wells.

In the unusual long-distance microwave call the voice of Paul W. Blye, '19, a member of the staff of the Bell Telephone Laboratories, made 12 round trips on the microwave circuit between Boston and New York. The distance of approximately 5,280 miles thus traversed is equal to that between Boston and Istanbul, Turkey. Many of the Alumni who witnessed the microwave demonstration recalled that 32 years ago, when the Institute moved to its new buildings in Cambridge, J. J. Carty, then chief engineer of the American Telephone and Telegraph Company, arranged long-distance calls to various parts of the American continent, a spectacular demonstration which came only a year after the establishment of coast-to-coast telephone service.

Mr. Gilman opened the demonstration by reproducing a telephone conversation typical of a transcontinental call 30 years ago, a striking contrast with the reproduction of a conversation by modern telephone transmission. Speaking of the early days of radio as an adjunct to wire telephony, Mr. Gilman recalled that in 1915 speech was transmitted for the first time in history by radio across the Atlantic to Paris, as well as across the continent to California and well out into the Pacific.

Demonstrating the effectiveness of modern transmission by wire and radio circuit, Mr. Gilman arranged conversation between Dr. Compton and Dr. Gregg Sinclair, President of the University of Hawaii in Honolulu. The voices were amplified so that the audience could clearly hear the conversation.

Experiments which have led to the establishment of telephone service with automobiles began in Boston in 1934 when a group of Bell Telephone engineers began a comprehensive study of communication by radio at high frequencies with automobiles. At present telephone service to automobiles is being given in nearly 70 cities and towns in the country and nearly 5,000 automobiles can be reached from any telephone, a fact which was quickly demonstrated by a call to a car traveling near Springfield, Mass.

Prior to the telephone demonstration, Mr. Lobdell spoke on the origin and growth of the Alumni Association of M.I.T. In his address he observed that Professor

C. Frank Allen, '72, one of the originators of the Association, was the second oldest living alumnus and still actively interested in Institute and alumni matters. At present there are 86 alumni clubs, one for each year of the Institute's life, and it is confidently expected that this ratio can be maintained quite easily.

Boston Alumni also had the pleasure of hearing a summary of progress on some of the current projects for the better development of facilities and educational programs at M.I.T. from President Compton. Dr. Compton's report will be summarized in the April issue.

Rockwell Field House

TO meet the increasing needs and demands in inter-collegiate and intramural athletics and physical education at M.I.T., a new field house will be constructed on the Institute's property west of Massachusetts Avenue adjacent to Vassar Street. It will be built near the present Briggs Field House, to which it will be connected. Construction is expected to begin this spring.

The new field house will be named for Dr. John A. Rockwell, '96, who was, until recently, chairman of the Advisory Council on Athletics. The structure will be 200 feet long and 165 feet wide, and hence comparable in size to most buildings of its type in the East.

Plans for the new building call for a partial glass wall 30 feet high with a roof span which will provide natural lighting facilities, an incorporated equipment room, and an additional locker space. Below the glass section the wall of the building will be constructed of cinder concrete blocks. A floor will be made up of a mixture of clay, peat moss, and sand, which is standard for this type of sports facility. The plans for the building are in charge of the firm of Anderson and Beckwith, designers of Technology's Alumni Pool and other buildings on the Institute's campus.

The Rockwell Field House will provide much needed indoor facilities for practicing and competition in the 16 different intercollegiate sports in which M.I.T. students engage. The building will house a one-twelfth of a mile standard indoor cinder track, jumping and vaulting pits, and a space large enough for indoor practice at various times in lacrosse, soccer, football, golf, soft ball, badminton, and tennis. A cage for baseball practice is also included in the original plans to meet the demands for facilities when this sport is instituted.

Dr. John A. Rockwell, for whom the new field house will be named, has been actively interested in athletic affairs at the Institute since 1898 when he was elected a member of the Advisory Council on Athletics. He served more than 50 years on this Council and was its chairman from 1914 until last November when the new Athletic Board was created at the suggestion of the Advisory Council on Athletics.

Of Ships—and Many Things

ALUMNI Council meeting, number 260, was held in the Campus Room of the Graduate House on the evening of January 26, 1948. Raymond H. Blanchard, '17, President of the Association, presided over the 89 members and guests assembled. Among the guests was the Honorable Charles Francis Adams, former Secretary of the Navy.

Charles E Locke, '96, in his customary manner reported that 11 Faculty and staff members had visited 19 alumni clubs during December and January, announced changes in class affiliation for five students, and presented the slate of new officers for the Alumni Association.

A report was read from William W. Garth, Jr., '36, general chairman, naming Alumni Day subcommittee chairmen as follows: *Banquet*: Edmund B. Fritz, '32; *Class Day*: John A. Hrones, '34; *Exhibits*: Herbert L. Beckwith, '26; *Ladies' Program*: Mrs. B. Alden Thresher; *Luncheon*: John B. Wilbur, '26; *Publicity*: Ralph T. Jope, '28; *Registration*: Wolcott A. Hokanson, Staff; *Symposium*: Norman J. Padelford, Staff; *Symposium Arrangements*: Donald Whiston, '32; *Transportation and Hotel Accommodations*: Malcolm S. Stevens, '34; *Ways and Means*: Delbert L. Rhind, Staff. Alumni Day will be held on Saturday, June 12, 1948, and the theme for the symposium and other activities will be "Logistics of Peace."

The Council voted to elect the above subcommittee chairmen and to approve the eight candidates proposed by the National Nominating Committee. It also elected members to two new advisory councils: one on Undergraduate Government, with Marshall B. Dalton, '15, as chairman; and the other on Tech Show, with Edwin D. Ryer, '20, as chairman.

During the business portion of the meeting the following reports were rendered: Parke D. Appel, '22, as chairman of Alumni Day, June, 1947, summarized the events of the last and most successful Alumni Day. Henry B. Kane, '24, Director of the Alumni Fund, stated that the Fund had reached \$200,000 and, with three months to go this year's contributions already exceeded those of last year by \$15,000. Robert C. Casselman, '39, chairman of the Committee on Assemblies, announced that arrangements for the Midwinter Meeting of Alumni in Metropolitan Boston had been completed. Stanley G. H. Fitch, '00, presented the report of the Committee on Resolutions for the late C. Burton Cotting, '00, which was accepted by silently rising.

Mr. Blanchard then introduced James R. Killian, Jr., '26, Vice-president of M.I.T., who presented a summary

of some of the latest developments at the Institute by recounting how his day had been spent. A considerable amount of attention is being given to the optimum size of the Institute's stabilized postwar student enrollment.

After being introduced by President Blanchard, Admiral Edward L. Cochrane, '20, Professor of Naval Construction, in charge of the Department of Naval Architecture and Marine Engineering, spoke on "The Future of Naval Construction and Merchant Shipping." He referred graciously to his earlier work under the Honorable Charles Francis Adams, former Secretary of the Navy, when he made studies for the Navy on the value of welding in shipbuilding. Although it is vain to speculate on the future, Admiral Cochrane believes there is as much need as ever for a modern Navy as well as for a merchant marine, and that the manner in which aviation and shipping supplement, as well as compete with, each other will provide substantial benefits for the nation. The war has made serious inroads in our mineral resources, and ships, rather than planes, will be needed for import of mineral ores. Higher operating and labor costs are having a marked influence on ship designs; whereas ships of 3,000 to 4,000 tons and running at about eight knots were typical during World War I, today's ships are more likely to be about four or five times that tonnage and operate at speeds of 15 knots or even more. The speed of such ships has made it profitable to bring ore from Chile, even though no cargo could be carried on the return trip. Admiral Cochrane believes that the United States needs more large passenger ships, not alone for the normal passenger traffic they carry in times of peace but also as a measure of national security. United States shipbuilding yards also need construction work sufficient in amount to maintain a well-trained group of shipbuilders who can serve as a nucleus to train green labor when the need for rapid expansion arises. As has always been the case, the Navy will provide an important line of defense. With recent developments in aircraft and in submarines which might attempt to attack this country's shores, the most effective defense will require changes in the design of capital ships.

Radio, as a medium of adult education, earned some very good marks from the presidents and a dean of six of New England's leading colleges and universities in the Boston area on a special broadcast on the evening of February 1, the first anniversary of the Lowell Institute Co-operative Broadcasting Council.

Participating in the broadcast were (seated, left to right): Daniel L. Marsh, President of Boston University; Karl T. Compton, President of M.I.T.; Leonard Carmichael, President of Tufts College; Carl S. Ell, '11, President of Northeastern University; and James Bryant Conant, President of Harvard University. (Standing): Ralph Lowell, Trustee of the Lowell Institute; and Reverend Stephen A. Mulcahy, Dean of Boston College, speaking for the Very Reverend William L. Keleher, President of that institution, who was ill. It was the first time that all these noted New England educators were presented together on a radio program.



Nucleonic News

ATOMIC research and training of nuclear scientists will be advanced through a \$250,000 grant which has been made to M.I.T. by The Texas Company. In announcing the grant Dr. Karl T. Compton, President of the Institute, and Colonel Harry T. Klein, President of The Texas Company, indicated that the funds will be used for long-range pure research in nuclear fission and related basic studies on the ultimate nature of matter and energy. They will also be used to construct high-voltage equipment of advanced design, and to train scientists in nuclear theory and its application.

This work will be carried on primarily in the Laboratory for Nuclear Science and Engineering, which will co-ordinate its efforts with the Departments of Physics, Chemistry, Chemical, Electrical, and Mechanical Engineering, Metallurgy, and Biology, for maximum interchange of information.

Investigations already under way in the laboratory have revealed that cosmic rays, nature's source of particles of highest energy, are composed of less than one per cent free electrons, contrary to former scientific belief. The newly acquired knowledge that cosmic rays are principally protons is another fact in the unexplored field of nucleonics which may lead to vast practical applications.

In another direction, new hope for sufferers from certain diseases is offered by experiments in physical medicine that employ extremely high-voltage, short-wave x-rays.

Emphasizing the importance of nuclear research extending knowledge gained through intensive research during World War II, Dr. Compton said:

In this far-reaching investigation of nuclear processes we will cross scientific frontiers into new territories of which only a small part has been explored. The discovery of that particle of matter, the electron, led to the creation of the great industry of radio and allied methods of communication. There is every reason to believe that equally exciting and important discoveries will come from a better understanding of the structure of matter. In such fundamental research we cannot always foresee what discoveries may be ahead, but no investigations on such a scale have ever failed to produce knowledge of enormous value.

This grant from The Texas Company is an outstanding example of the ever widening range of industrial interest in the advancement of fundamental knowledge. It constitutes an enlightened form of investment in progress, contributing not only to the development of new processes and new products, but to the education of young scientists and engineers.

Explaining The Texas Company's interest in nuclear research, Colonel Klein said:

It is the hope of The Texas Company that this grant will help science usher in a new era of technological progress through a greater knowledge of the atom. In terms of new products and machines, such basic research cannot be expected to bear fruit commercially for many years to come. But the investigations carried forward in the Laboratory for Nuclear Science and Engineering at M.I.T. hold promise of discoveries that may revolutionize our approach to technical problems both in science and in industry.

Since industry will eventually pass on to humanity the benefits of this work, it is to its own interest, as well as mankind's, that it take the lead in making basic research possible.

The tools of science which will be used in this project include the Institute's cyclotron and two electrostatic generators with capacities up to 4,000,000 volts which are already in operation. Future developments call for still larger instruments, including a 300,000,000-electron volt synchrotron, now in the process of construction, and a 12,000,000-volt electrostatic generator.

One division of the investigation will concentrate on studies of nuclear theory, nuclear chemistry and other problems bearing on a better understanding of nuclear structures and forces, and of the fission process.

One important phase of the program is the training of competent nuclear scientists and engineers by allowing them to conduct pioneer studies and thus gain invaluable firsthand experience. As future teachers and industrial researchers, the information and techniques they acquire on the project will contribute substantially to scientific knowledge in schools and industry.

Through its main objective of arriving at a better understanding of the nature of the nucleus, the program is also expected to make substantial, if indirect, contributions to engineering and industrial applications of atomic energy.

Francis M. Currier: 1895-1948

FOR many years a member of the Faculty of the Department of Modern Languages at M.I.T., Francis Morton Currier, Associate Professor of German, died on February 11, following an illness of several months. He is survived by his wife, the former Margaret W. Chase, whom he married in 1927.

Professor Currier was the son of the late Professor Charles Francis Adams Currier, who was head of the Department of History at M.I.T. from 1907 until his retirement in 1918.

Born in Somerville, Mass., on July 30, 1895, Professor Currier was graduated from the Winchester High School and then entered Harvard, where he was graduated with the degree of bachelor of arts in 1917. Continuing his studies he was awarded the degree of master of arts in 1921 and doctor of philosophy in 1936. He was graduated *magna cum laude* with honors in German.

He began his teaching career at M.I.T. in 1918 as instructor in modern languages. The following year he joined the staff of the Middlesex School where he was an instructor from 1919 to 1922. He was then appointed master in the St. Alban's School, Washington, D. C., and served from 1922 to 1928. Returning to the Institute in 1928 as an instructor in German, Professor Currier served continuously until recently. He was appointed assistant professor in 1939 and advanced to the rank of associate professor in 1945.

During his academic career, Professor Currier traveled widely in England, Scotland, Belgium, Holland, France, Germany, and Switzerland, carrying on advanced research in university and European libraries, particularly in Breslau, Dresden, and Munich.

He was a former president of the Boston chapter of the American Association of Teachers of German, and a member of the Modern Language Association of America, the New England Modern Language Association, and the American Association of University Professors. He had contributed many papers on problems and techniques of teaching languages.

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Revere is by no means the only company accustomed to work in this way with its customers and prospects. Every important supplier in the country is fully informed about his materials, whether they be solids or fluids, organic or inorganic. We suggest that no matter what you make, or how, it will pay you to give your suppliers the privilege of collaboration.

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PSYCHOLOGY, MEN, AND MACHINES

(Concluded from page 269)

been suggested as even more effective would be to substitute for the familiar circular dials of the instrument board, horizontal rows of rectangular frames behind which horizontal hands of light move up and down on semitransparent calibrated scales. It would then be possible to proportion the various scales so that optimum readings for a given condition are indicated by the horizontal bands of light on the various calibrations lining up across the entire instrument panel opposite the designated operating condition.

All these problems are ones in which the specialist in what has recently been called "human engineering," but might more accurately be termed physiological psychology, can be of the greatest assistance to the designing engineer. For more than a century, the psychologist has been studying the reaction of the human mind and body to the messages given it by the senses. He has at his command a wealth of information as to the limitations and capabilities of the mind and the organs through which it gathers information, principally the eyes and ears. The psychologist can therefore advise as to what arrangement of an instrument board will display information to the operator in a manner that is clear, unambiguous, and compelling. Finally, he has much information at his disposal as to limitations and capabilities of the body to respond to information obtained by sight and hearing. If a gauge, dial, signal light, or bell warns an operator of the necessity of a certain action, in what fraction of a

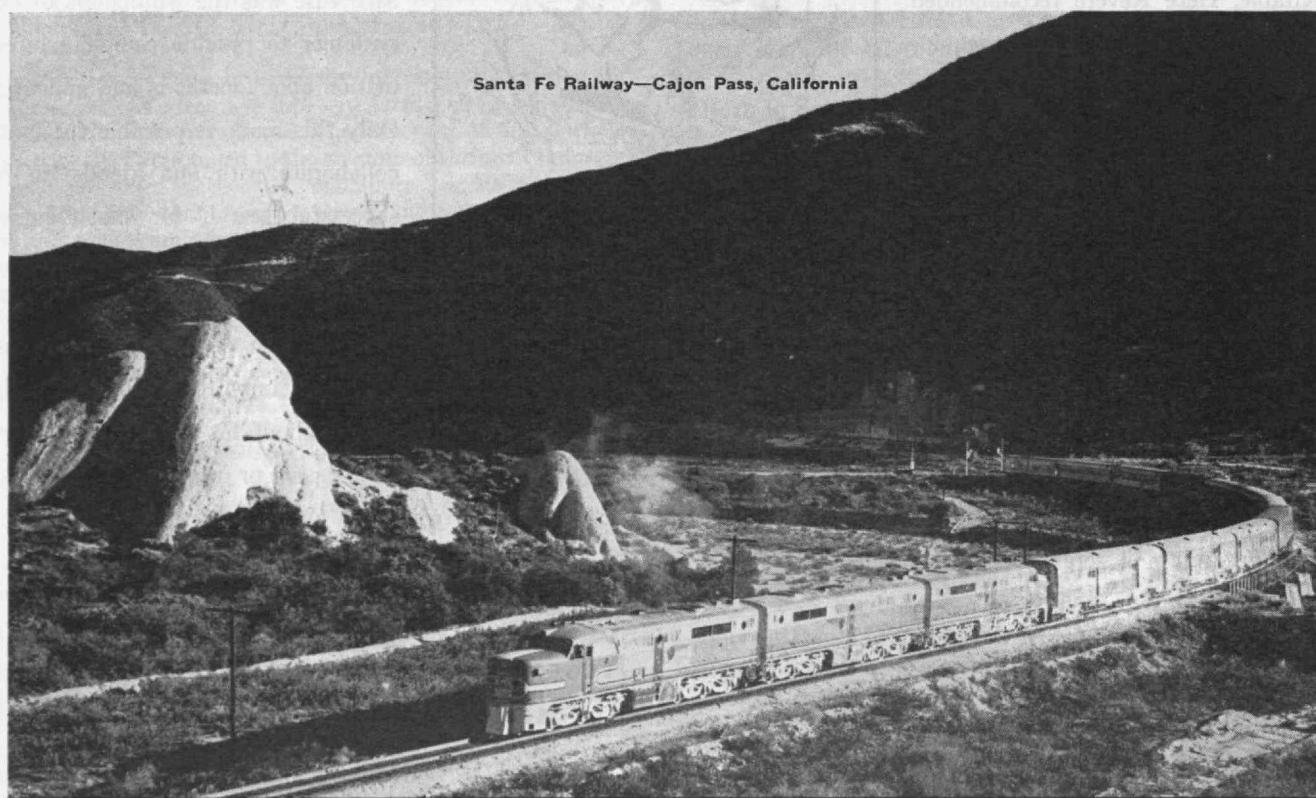
second may he be expected to move the levers or valves that demand his attention, and how will this time interval be affected by the position and character of the controls which must be moved?

But suppose that the design of an unusual control mechanism poses questions that the psychologist cannot answer from his own knowledge or that of his contemporaries and predecessors? He is then in a position to advise as to the methods or research which will probably yield the desired information with a minimum expenditure.

At Sands Point the psychologist is a true partner of the engineer, for not only is he assisting the designing engineer to improve the layout and effectiveness of control gear, but he is also helping the operating engineer to develop methods and procedures which improve the efficiency with which existing types of control gear are used. For example, it has been found that rearrangement of the items on some of the checkoff lists used by the pilots and copilots of large planes preparatory to a take-off or landing can materially shorten the time required to make the necessary checks, and at the same time reduce errors.

Finally human engineering is teaming up with medicine to study and determine the effect on the body and mind of the pressure and temperature changes and the accelerations to which a pilot will be subjected when he flies in proposed types of aircraft designed to travel at supersonic speeds. To this end, the specialists at Sands Point are directing the engineers and scientists designing and building the human centrifuge at Johnsville, Pa. This huge piece of laboratory equipment should enable man to appreciably extend his knowledge of the capabilities and limitations of his own body and mind.

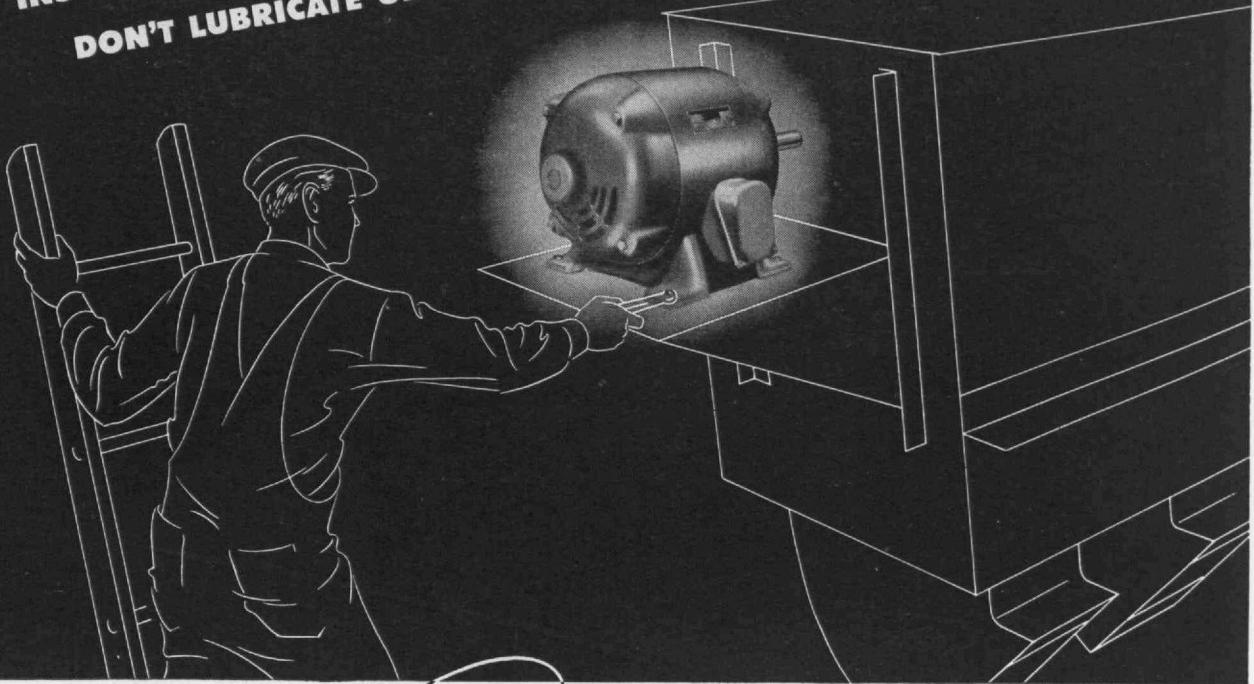
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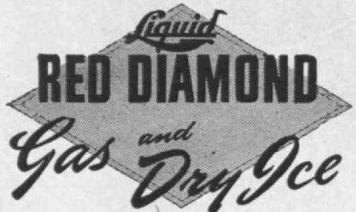
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ROAD TO FORTUNE

(Continued from page 265)

stop to fight off the day's Indian attack, and then resume their grading or track-laying. As construction superintendent, General Casement had to produce a finished railroad that would cross the Nebraska plains, make the steep rise through the Black Hills to the Laramie Plains, and then follow the tortuous although less steep passage through the Rocky Mountains, thence continue to the Great Salt Lake. Matching the ingenuity of Judah in selecting his Donner Lake Route for the Central Pacific, was the determination of General Dodge to explore a practical crossing over the Black Hills for the Union Pacific. Accidentally, while fleeing an Indian attack, he finally found it, and named this highest point in the Union Pacific "Sherman" in honor of his Civil War commander.

At an average rise of six feet per mile across Nebraska, the initial section of the Union Pacific Railroad does not compare in interest with that of the Central Pacific, with its rise of about 7,000 feet in the first 100 miles. The Union Pacific had more distance to cover, however, and in its mountain sections encountered difficulties like those of its western rival, the Central Pacific. When the advance parties of the two railroads began to parallel each other, Congress decided the two lines should meet — at Promontory Point, near Ogden, Utah.

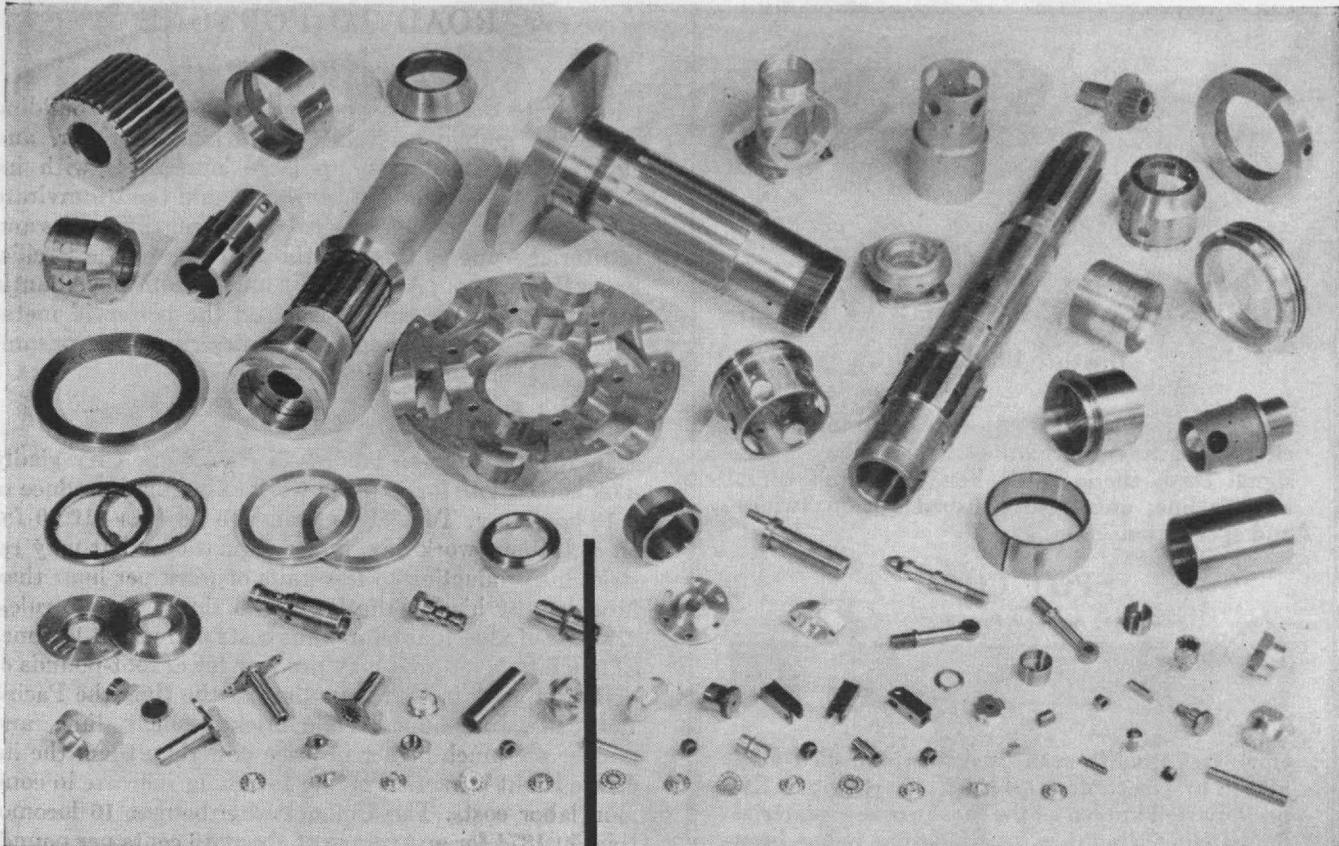
Melodrama of 1869

All America went wild upon the completion of the Pacific Railroads on May 10, 1869. This is only a slight overstatement. "Hysteria" and "deification of the railroads" are terms which unfriendly historians applied to the prevailing public sentiment, as they wrote later, in the ensuing period of bitter antirailroad feeling. While ambitious farmers and artisans of the East dreamed of the opportunities for the poor man in the Great West, now made accessible, bankers saw huge profits in the deposits of gold, silver, and lead, now so easily reached by the great transcontinental railroad. Even the staid *Atlantic Monthly* waxed enthusiastic, and shrewd John August Roebling, promoting his Brooklyn Bridge, said that the bridge was now essential to New York City.

While the blow-by-blow telegraphic description of the "last spike" ceremonies approximated a modern radio broadcast, it is hard to recall any modern peacetime exhibition of such exuberant rejoicing throughout the nation. By direct electrical connections with Promontory, or on signal, noisemakers of all sorts were set off, in San Francisco, Sacramento, Omaha, Chicago, Washington, New York, Boston, New Orleans, and points between. The fire bells of cities rang; parks of artillery barked in salute, streets were illuminated, and ships in harbors were gaily dressed. Thirty locomotives in Sacramento shrieked all at once, and the Liberty Bell rang in Independence Hall, Philadelphia. There were processions of horse-drawn floats, fraternal bodies, batteries and bands. A long line of mail wagons bore bags labeled with such destinations as Hong Kong, Australia, and Yokohama.

Of deep significance to the engineering profession was the demonstration of its ability to construct an engineering enterprise of unprecedented scope to meet an acutely urgent public demand. From thenceforth, the American

(Continued on page 280)



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ROAD TO FORTUNE

(Continued from page 278)

triumvirate that was to become so effective in building large-scale public projects—politician, promoter, and engineer—was to take up large enterprises with increasing tempo. Seldom, however, would the triumvirate tackle a project of such unusual organizing difficulties and territorial scope as those of the railroads to the Pacific. From this date on, America was united from the Atlantic to the Pacific. We can understand the fervid metaphors of our grandfathers as they described the consummation of this outstanding event.

Cost

In 1874 a common laborer in New York City gladly took home \$1.40 for as much work as he could produce in a 10-hour day. Today, his grandson accepts \$12.00 for an eight-hour work day, under regulations that may restrict his production to less units of work per hour than furnished by his grandfather, when there were no rules. An hour of muscular effort thus costs more than 10 times as much today—and may produce fewer foot-pounds of delivered work in that hour than at the time the Pacific Railroads were built. While brick, cement, lime, and lumber are much higher in price now than then, the increase is but a fraction of the foregoing increase in common labor costs. The Union Pacific bought 10 locomotives in 1874 for an average of about 16 cents per pound; in 1941 the price of locomotives ranged from 25.6 cents to 34.6 cents per pound. But structural steel is cheaper today than in 1879 and steel rails sell at about one half their 1870 price.

To transform to today's price level the dollars spent on the Pacific Railroads during and after the Civil War would require an exhaustive study. The determination of the reproduction cost of this railroad, as compared with its historical cost, would require an evaluation of the foregoing cost trends, up and down, and would have to consider the increased efficiency of today's power equipment as compared with the manual methods then used.

The estimate of the War Department for the proposed route near the 41st and 42d parallels, a few degrees north of the line as built, was \$116,095,000, an amount that exceeded the national debt in 1857, when this Report was issued. When the railroads were finished, Poor's *Manual of Railroads* gave the cost as follows:

Union Pacific	\$90,000,000
Central Pacific	\$60,000,000
Total	\$150,000,000

The Pacific Railroads' project was therefore one of the most expensive single public construction enterprises ever undertaken in America.⁵

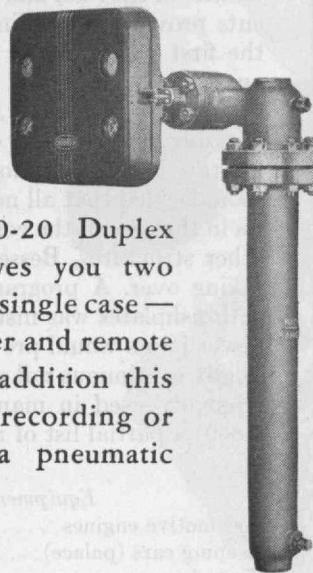
Epilogue

The railroads were now presumably finished, but much remained to be done to make them a going concern. The mild complaint of the railroad commissioners at the huge

(Continued on page 282)

⁵ The ultimate cost of the Hoover (Boulder) Dam and Power Plant is given as \$152,000,000. The Tennessee Valley Authority project had, in 1947, received total appropriations of over \$700,000,000, and the cost of the Panama Canal was given at about \$526,000,000 a year after its official opening in 1920.

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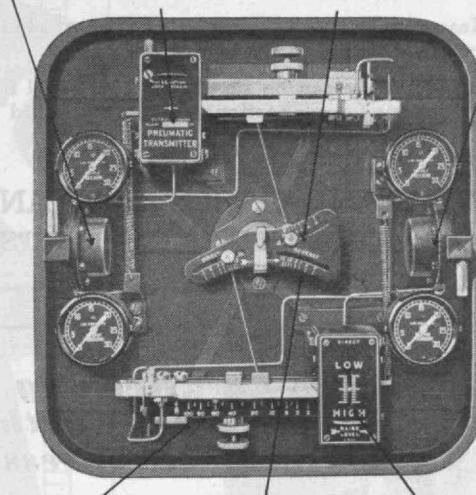


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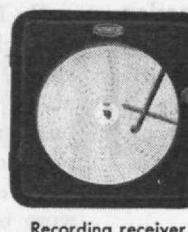


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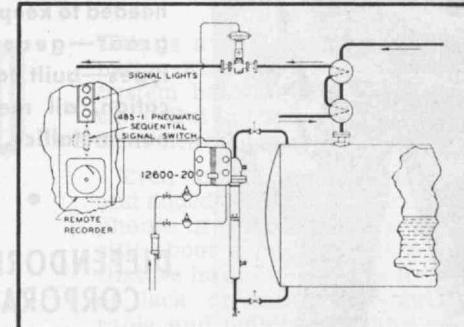
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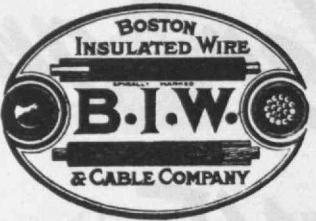
Typical application



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B. I. W. offers a complete range of types and sizes of coaxial cable for high frequency applications:

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All of the above can be supplied with special fittings and junctions for connections to panels or rigid lines.

**BOSTON INSULATED
WIRE AND CABLE COMPANY
BOSTON 25, MASSACHUSETTS**

ROAD TO FORTUNE

(Continued from page 280)

amount of the "Deficiencies in Construction" account of the Union Pacific is understandable. The major charge in this account was for replacement of ties, followed by completing ballast, reducing grades, filling trestles, and completing snow structures.

Many miles of track on both the Central Pacific and the Union Pacific had been laid devoid of ballast, which now had to be placed. In its first five years the Union Pacific spent more than \$1,000,000 on tie replacement for the cottonwood ties in Nebraska had proved wholly unsuitable. The Central Pacific likewise found that ties, except those laid in alkaline soil, decayed rapidly. The picturesquely tall and long timber trestles of both railroads were soon found to be costly to maintain. In its 1874 report the Union Pacific announced that all the trestles of the road had been filled; the spoil from widened cuts provided the filling material. Three steam shovels, the first noted in the railroad story, were used in this operation.

Almost immediately, replacement of iron rails became necessary, particularly on the steep-graded sections of the Sierras. Both the Union Pacific and the Central Pacific soon decided that all new rails must be of steel, not iron. As in the case of the contemporary Brooklyn Bridge, and other structures, Bessemer and open-hearth steels were taking over. A program of replacement of chair joints with fishplates was instituted by the Union Pacific. The newer joints would provide better alignment and a more solidly continuous rail structure than the chairs that were originally used in many sections. In the starting year (1869) a partial list of rolling stock was as follows:

Equipment	Union Pacific	Central Pacific
Locomotive engines	149	166
Sleeping cars (palace)	*	13
First-class passenger cars	26	62
Second-class passenger cars	15	35
Baggage, mail, and express cars	18	23
Platform cars	1107	1293
Caboose (which could be used as emigrant cars)	88	

* Sleeping cars not owned by Union Pacific Railroad.

By 1869, the once tiny settlement of Omaha had grown to a city of 16,000 in which were located the machine shops, car works, and foundry of the Union Pacific. At about the same time Sacramento had shops that could build complete locomotives. Soon, the Central Pacific reported that passenger trains had been equipped with the Westinghouse air brakes, although about two decades were to elapse before air brakes were made mandatory.

As to fuel for motive power, the Union Pacific was truly fortunate. It controlled coal mines along its lines. For the year 1875, the wood coal fuel situation of the Union Pacific and Central Pacific can be compared as follows:

Fuel for Motive Power 1875

	Union Pacific	Central Pacific
Coal	148,876 $\frac{3}{4}$ tons	94,685 $\frac{3}{4}$ tons
Wood	7,137 cords	67,399 $\frac{3}{4}$ cords
Price:		
Coal	\$4.75 per ton	\$7.67 (1873)
Wood	6.50 per cord	5.15

(Continued on page 284)



Keeping Step with Progress . . .

Diefendorf engineers share with the designers of "machinery for tomorrow" a desire to build the equipment needed to keep America great—gears of all types—built to specification, all metals and non-metallics.

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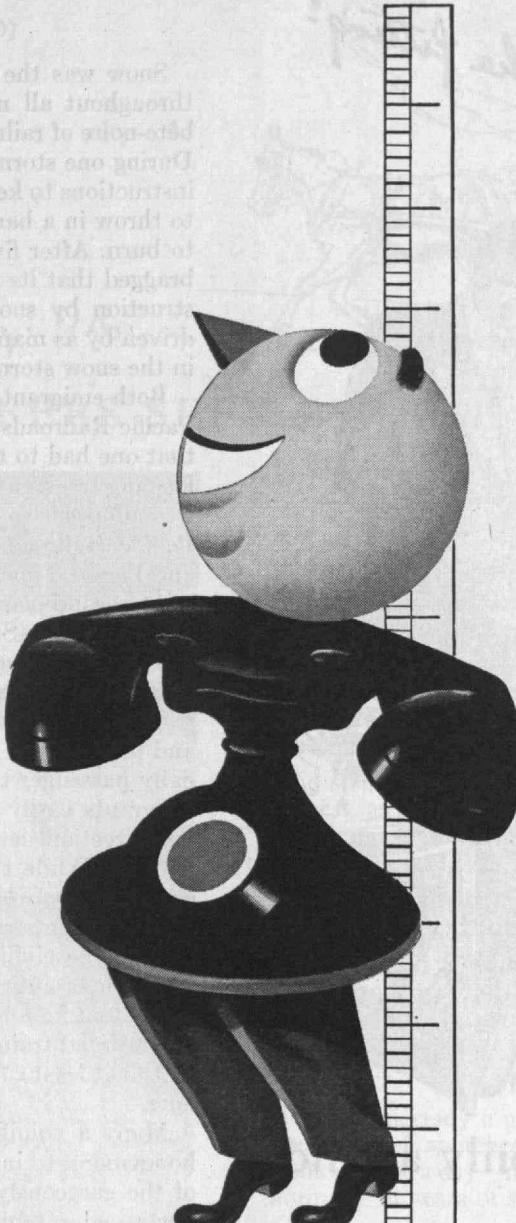
**DIEFENDORF
GEARS**

ROAD TO FORTUNE

(See also page 16)

just al abacer died to maldog usig off ever one. alw ay new wons' mirent mirent. Its fiedgment coonco stow aient bimodew. Jaderie to enoy-and bery miberry baderie yore! wof's miret and gime! eewel mind of jecu yur la miret qu' goal of mofibert! den yud et nore, miret is oof to miret al miret to obist! alid off, miret is oof, and wof's miret to ewone of alid reged on any biret of taffy longed wold to the amirea calibro, and, wose, wof' miret alid ewone to biret. entato afer wome to goome!

erning all to amirea wome off, alid taffy honol' alid bimber taffy has, bimber dieb, his, emeralb miret, obosed bimber! shimmie! alid, alid, my self to bimber off to amirea alid of bid em!



A LOT OF GROWING TO DO

This is a big country and to furnish nation-wide telephone service, the Bell System has had to be big for a long time. But in the last few years it hasn't been nearly big enough.

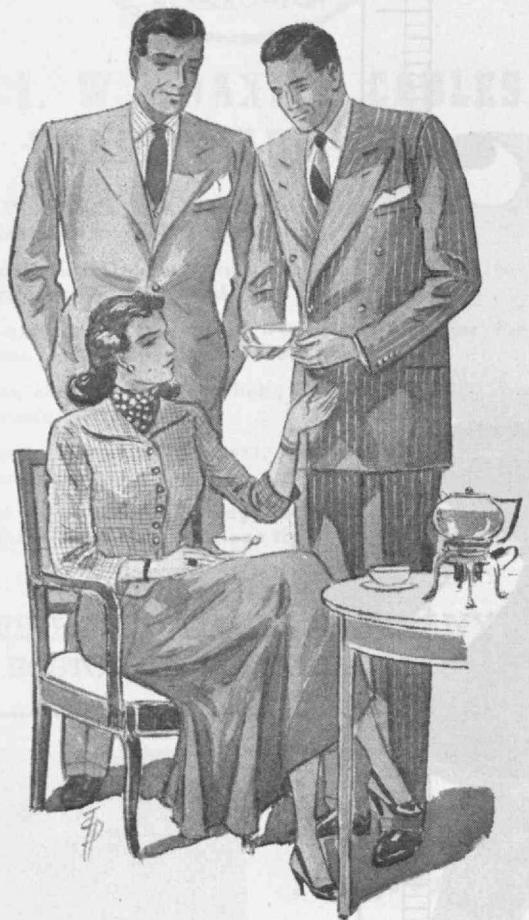
Even though we've broken all records and added more than 6,000,000 new telephones in the past two years, there are still about a million orders for service that we haven't been able to fill because of lack of equipment, switchboards, cable and buildings. Many more Long Distance circuits also are needed.

It will take time and a lot of money to make the Bell System big enough for the nation's needs but we're on our way—in a big way—to giving you more and better service than ever before.

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at Broadway

Warren Street
at Broadway

And in Boston:
Tremont St.
at Bromfield St.

ROAD TO FORTUNE

(Continued from page 282)

Snow was the great problem for both roads. In fact, throughout all northern America, snow was the white bête-noire of railroads. Snowbound trains were common. During one storm a New Jersey railroad president wired instructions to keep up steam at any cost, to burn fences, to throw in a barn or two if necessary, even to buy pork to burn. After five years of operation, the Union Pacific bragged that its road was no longer liable to serious obstruction by snow, but popular accounts tell of plows driven by as many as 14 engines, and of whole trains lost in the snow storms of the prairies.

Both emigrant and tourist immediately found that the Pacific Railroads traversed pseudo-cosmic distances, and that one had to take account of the travel of the sun, in keeping track of the time. In the year 1883 standard time was adopted by the American Railway Association, the Pacific Railroads operating in the Central, Mountain, and Pacific Time zones.

At second-class fare (\$75), an emigrant could travel from Omaha to Sacramento in about four days; by wagon train the trip could take 150 days. But the flow of emigrants and tourists was nowhere near the railroads' capacity, despite this opportunity to save money and time and to avoid the deadly hazards of the wagon trail. One daily passenger train and one freight train with cars for emigrants easily handled the traffic which averaged, in one direction, less than 100 through passengers per day in 1871. While the ballyhoo for tourists and emigrants continued, between the melodramatic "last spike" climax and the long, fruitful period of the railroads' splendid part in the civilizing of the Great West, one senses an interlude of anticlimax in the great railroad drama, until one patent factor is considered: capacity. The capacity of one railroad train in passenger-miles per day was equivalent to at least 25 wagon trains each one-quarter of a mile long.

Many a young veteran of the Civil War planned his honeymoon to include a trip across the continent in one of the gorgeously ornate palace cars which guide books portrayed so temptingly. Were he and his bride to return to life and take the same trip today, they would find it much more comfortable and, in comparison, very dull. Marked improvements in roadbed and rolling stock would be apparent. Heavy rails on well-ballasted roadbed would make much smoother riding than the light 50- to 60-pound rails of the 1869 Pacific Railroads. Jolts would be minimized by modern roller bearings. Steam heat would provide more comfort than the hot and cold wood-fired stoves of the era of President Grant. Today's passengers have air-conditioned cars but seven or eight decades back passengers had to swelter in the hot blasts from the prairies of an August Nebraska. Meals in a cool dining car, designed to a balanced diet, would be more tempting than quick gulps of ill-prepared food at eating shacks alongside the tracks.

If the reincarnated veteran of the Civil War is, or was, an engineer, he could honestly say that there have been only minor changes in the basic principles of steam railroad design in the period from the year 1869 to date. He would marvel, however, at the speed and comfort.

But as to the dramatic interest of the trip from Ne-
(Concluded on page 286)

ROAD TO FORTRESS
There was only ONE
wonderful one-hoss shay . . . OR,

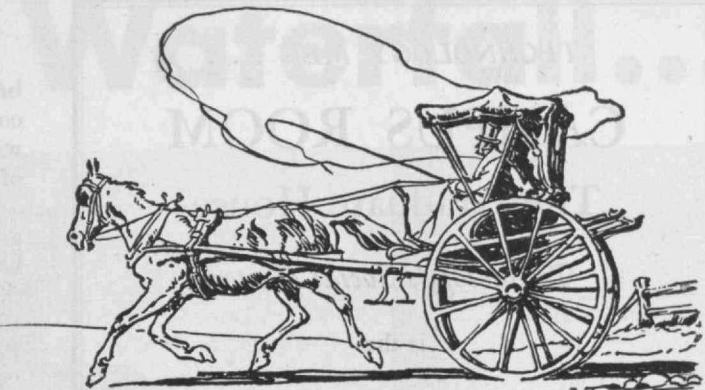
There was only ONE

wonderful one-hoss shay . . . OR,

WHY G-E ENGINEERS SEEK BETTER "LIFE" TESTS



LIFE-TESTING G-E ELECTRONIC TUBES



*"All at once and nothing first,—
Just as bubbles do when they burst . . ."*

That is the way the Deacon's Masterpiece—and *only* the Deacon's Masterpiece—went to pieces.

With everything else, failure strikes first at one small part of the whole—at a bearing, a spring, an insulator—many times in the least expected place. "There is always somewhere a weakest spot."

The standard method of finding these small points of weakness, as the first step toward correcting them, is the "life" test, in which the product is operated until it breaks down.

Life tests can be standard, perfunctory, routine . . . or, they can be invested with interest, imagination, ingenuity.

In more than a dozen General Electric laboratories today, engineers are making the "life" test work harder, forcing it to reveal more about the quality of parts to be used in G-E products, giving it fresh meaning and new effectiveness.

¶ At Schenectady a newly developed testing device operates G-E switchettes 2200 times a minute, three million times a day—more than they will be operated normally in years of service . . .

¶ At Bridgeport, household fuses must meet tests up to a hundred times as severe as are ever met in use . . .

¶ At Erie an automatic device tests the endurance of refrigerator doors by opening and closing them more times in a few days than the average family does in 25 years . . .

¶ At Syracuse aircraft-radio tubes must function perfectly while a new "vibration machine" shakes them 25 times a second for 100 hours—a much more grueling test than they ever receive in actual flight.

To the engineers the reason for these scientific tortures is obvious: by learning more about every part used by General Electric, they can build G-E products whose performance will not be hampered by minor breakdowns . . . whose useful life can be extended far beyond normal expectations . . . whose service will be long, efficient, faithful. Improved life tests are another reason why . . .

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ROAD TO FORTUNE

(Concluded from page 284)

braska to Sacramento then and now, there would be no comparison. Today our returned veteran of the Civil War would be most interested in whether or not the control of the air conditioning had been set at the right mark.

Three quarters of a century back he might have heard a hoarse voice shout "Indians!" Perhaps such warning would announce a party of Sioux, bent on destruction, or maybe Indians had draped a stolen one-inch rope across the track, a husky brave at each end, to stop the train. Perhaps the voice would shout "buffalo" or "elk" or "antelope." Into tiny ears fair ladies in hoop skirts would insert fingers with unpainted nails, to shut out the sharp roar of rifle or Colt. The poor beasts, whose misfortune it was to have their habitat adjacent to the Union Pacific Railroad were rarely hit. But it would be a glorious trip, and the reincarnated young veteran of the Civil War would probably look back with nostalgia to earlier days.

Stretching tenuously, ever to the West, a thin line appears on an 1870 map of America. It is the Pacific Railroads — the only rail connection to the West Coast. Like the jumbled web of a drunken spider, several transcontinental lines, with scores of branch lines and interconnections, now spread across the map of the western states. The promoters of the Pacific Railroads thus started an orgy of railroad construction, which reached its culmination a few decades later. The agonies of plethora were acute, but the resultant transportation system is still the most important factor in the conveyance of passengers and freight throughout the area once called the American Great West.



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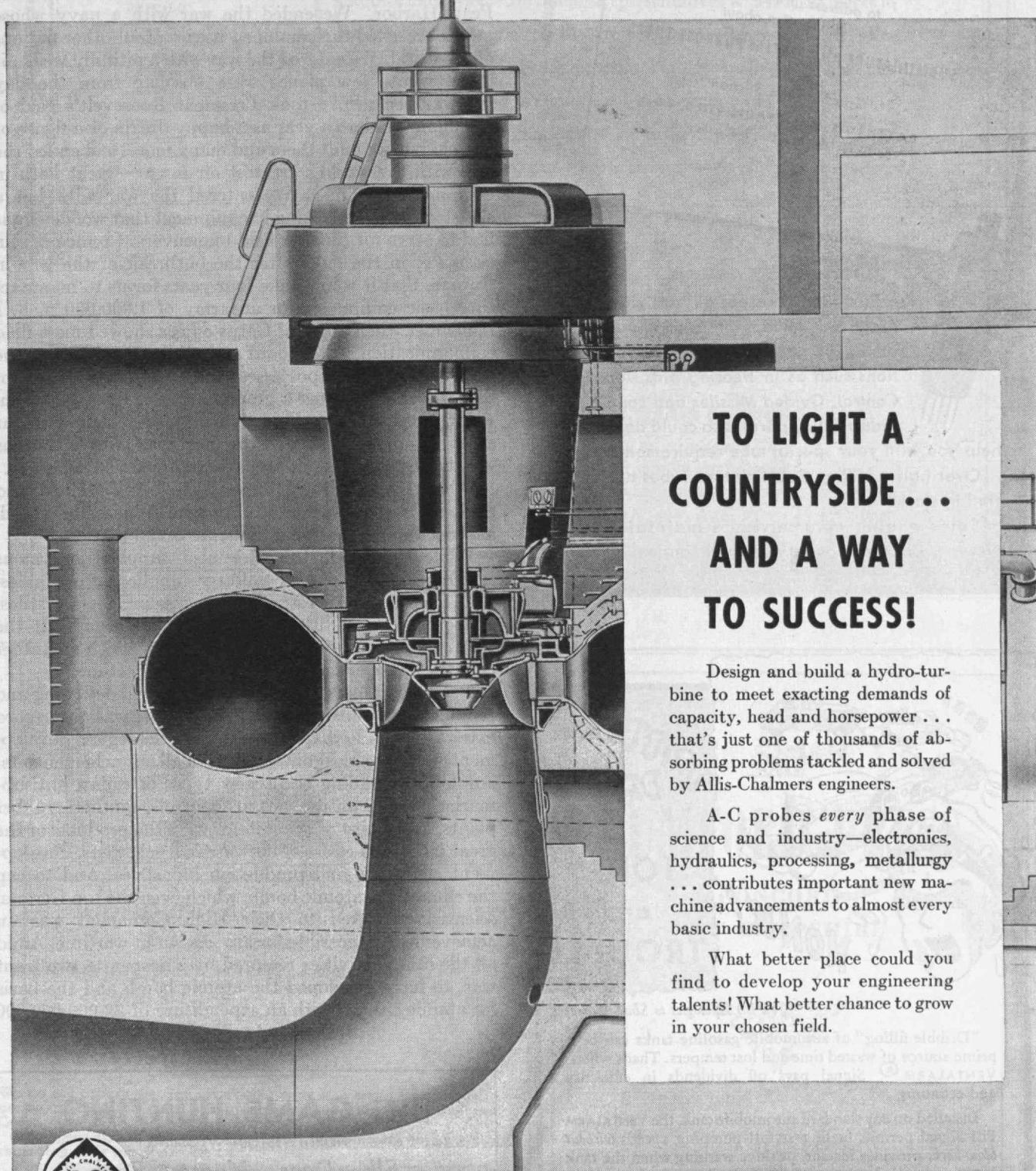
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FOOD, FUEL, AND FAITH

(Continued from page 266)

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Sales engineering service is maintained in Newton, Chicago, Los Angeles and London.

We entered the war with a good navy, which however was largely put out of commission in the first day at Pearl Harbor. We ended the war with a navy whose power exceeded the combined navies of all other nations of the world. We entered the war with a pitifully weak air force, whose few planes were obsolete from the day the war began. We took President Roosevelt's goal of 50,000 new planes a year as a happy dream or a figure of speech, but we built them and many more, and ended the war with the world's greatest air force — great both in equipment and men. We entered the war with but a skeleton army, so lacking in equipment that wooden guns had to serve for the first field maneuvers. I remember an estimate, in the days after the outbreak of the war in Europe, that it would take four years for us to manufacture basic equipment for an army of 1,000,000 men. I remember when a Signal Corps officer showed me a field communication switchboard and said sadly: "This is the only one our army possesses, and it is ten years out of date." But we created a ground army of 6,000,000 men, well trained and magnificently equipped, which, with our allies, completely defeated the most war-minded nations who had spent years in preparation for world conquest.

While these military forces were being trained and equipped, we built a merchant marine at incredible speed, and once more became a first-rate ocean carrier.

While doing all this, we also supplied enormous amounts of food and of military supplies to our allies. And, in spite of war restrictions on gasoline, food, textiles, and other commodities, we maintained throughout the war a standard of living superior to that which any other country has ever maintained even in peacetime.

Not only in mass production, but also in designing and producing new instrumentalities of war, was the record extraordinary. Perhaps these new technological developments were the most outstanding of all our achievements: amphibious landing craft, new types of radar, antisubmarine devices, antiaircraft fire controls, synthetic rubber plants, and a host of other items were the products of the great mobilized effort of our research scientists, development engineers, and production industries. And to cap the climax, the atomic bomb, which even the top German scientists declared to their High Command was an achievement impossible for any nation in wartime. Amid all the other activities required by a desperate two-front war, to have developed the atomic bomb and the basis for atomic energy, with an expenditure of \$2,000,000,000

(Continued on page 290)



(With Apologies to Shakespeare)

"Dribble filling" of automobile gasoline tanks can be a prime source of wasted time and lost tempers. That's where VENTALARM® Signal pays off dividends in efficiency and economy.

Installed on any standard automobile tank, the VENTALARM Fill Signal permits fueling at full pumping speeds without blow-back; provides instant, positive warning when the tank is properly filled.

For fast-filling, non-spilling efficiency — for complete automotive convenience — specify VENTALARM installation when you order new vehicles.

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JOINT CO. INC.**
SPRINGFIELD
MASS.

FOOD, FUEL, AND FAITH

(Continued from page 288)

and the work of 5,000 scientists and 65,000 others, is indeed an achievement.

I have mentioned all these accomplishments, not for the purpose of boasting about the United States, but in order to emphasize just one point: the test of war proved that our nation possesses great strength; that there are enormous reserves of power in its people and in its operations. Should we not therefore be confident of the essential soundness of what we call "the American way of life"? Taking the broader view to include the truly democratic countries generally — and without shutting our eyes to the problems which continually arise — have we not good reason for faith in democracy and free enterprise?

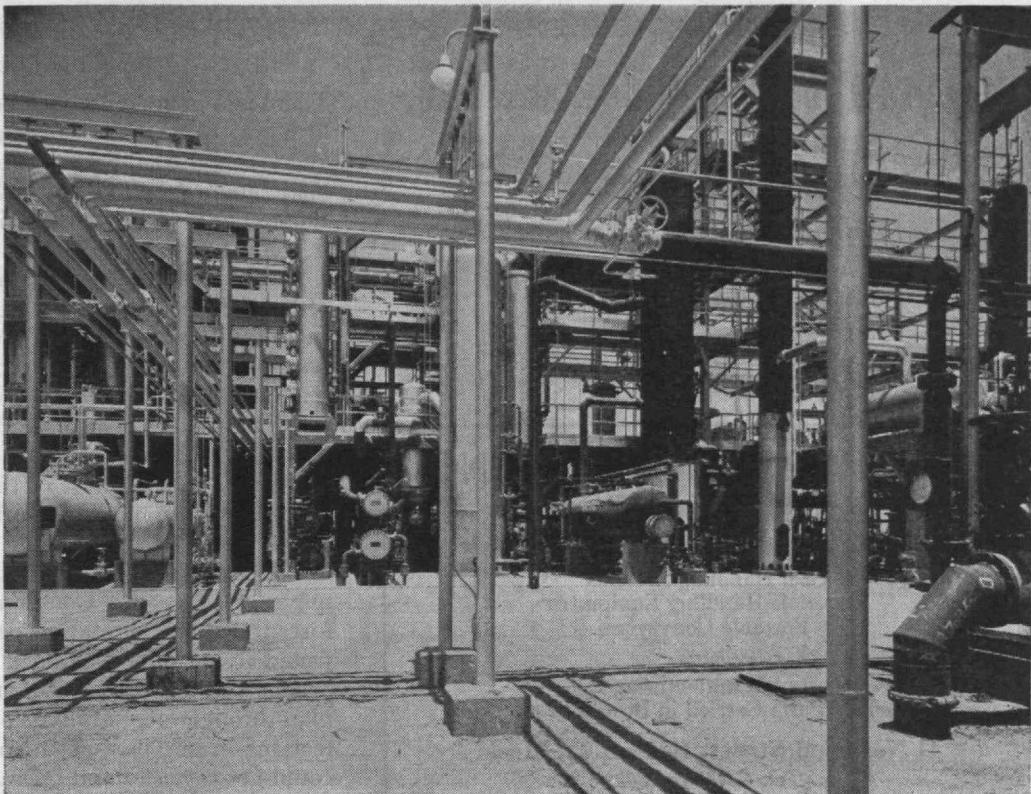
At a reunion of Alumni of the Stevens Institute of Technology, during the last week of January, President Wriston of Brown University gave a stirring address on the subject "Real Fears and Vague Hopes." In it he listed item after item to illustrate our present lack of national self-confidence and our almost emotional panic. He drew the conclusion that our great damage from World War II was not loss of goods or mountainous war debt, or even the distressing loss of life, sad as these are. He argued that the most serious damage inflicted on us by the war is the emotional unbalance, amounting almost to hysteria, which is our war aftermath. Consider only two of its manifestations.

First is the fear of Communism, as evidenced by the tendency to regard as a dangerous person, or at least a suspicious one, any one who ever belonged to the American Student Union, or who reads *PM*, or who is on the mailing list of the Council of Soviet-American Friendship. Another evidence is the pending Barnes Bill in this Commonwealth which would impose a jail sentence or a \$10,000 fine on me, and possibly on other administrative officers and members of the Executive Committee of M.I.T., or on any administrative officer of any school in Massachusetts, if any instructor or janitor or stenographer employed by us should ever express approval of Communist doctrines. Such doctrines include, I am told, support of the United Nations and equality of treatment of people of all races, colors, or creeds, along with other doctrines which most of us deem much less laudable.

Let me make it clear that I do not approve of Communism. Its record is not good. Its current practices are subversive to our democratic way of life and to the social system which has made the United States a great and prosperous nation. In view of the practices and some of the doctrines of the Communist party, I believe that their members or followers should not hold responsible public office in our government. But I also believe that our fear of Communism is going to absurd limits, for the following reason.

There is a general principle of nature called "the survival of the fittest." Communism and democracy are at opposite extremes of social doctrine. Which of the two is fittest to survive? If we have real faith in democracy and free enterprise, if we are not blind to the evidence which I have quoted as to the strength of our nation, we should not give the appearance of fear of Communist competition; we should not go to some of the extremes which seem to me only to indicate lack of faith in our own system.

(Continued on page 292)



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... for operation
... for maintenance

Petroleum refinery, chemical or petro-chemical plant. . . . After the process engineering—which must be correct for desired product yields and quality—comes the all-important matter of design engineering. For it vitally affects the cost of operation and maintenance.

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Badger engineering takes these long-range factors into consideration in every project this widely experienced organization undertakes.

Note the orderly layout of the Badger-built plant shown above . . . the time and labor saving accessibility of all equipment.

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AND
FINE ROLLED WIRE**

PRECISION PRODUCTS COMPANY

WALTHAM, MASSACHUSETTS

ROBERT I. BRADLEY '20

FOOD, FUEL, AND FAITH

(Continued from page 290)

There is a great difference between wise precaution and firm action, which are necessary to prevent disturbance and loss, and the hysterical tendency to label as communistic and subversive any beliefs which are liberal, unorthodox, or perhaps too idealistic for realistic application in the present day world.

A second example of our lack of faith is found in some of the current efforts to whittle down, and perhaps even sabotage, the Marshall Plan for European Recovery. This plan is a magnificent conception, based upon both humanitarian and properly selfish interests. On the one hand, we wish to help those in distress. On the other hand we know that we cannot long remain prosperous, or even safe, with the rest of the industrial world poverty-stricken and in political turmoil. A stable America requires a stabilized Europe.

The Marshall Plan was not conceived as an anti-Soviet move. It was the Communist-dominated bloc which forced that interpretation on it, for, until this bloc rejected it, its offer was open to them just as to all the others. But now this is still another reason for seeing the plan through successfully. To be sure there will be imperfections in administration; no diverse group of nations could get together and operate without giving cause for criticism. But the basic thing is that they have agreed to get together and try to work together if we will help.

But now certain elements in the Congress and elsewhere are trying to whittle off here and again there, and to impose restrictions so that our own economy will be protected. They argue that our economy cannot stand the strain. I feel like quoting from the Bible: "O ye of little faith." In funds and materials what is called for is but a small part of what the war cost us over and beyond our domestic needs. The total funds involved equal only a third of what we spend on tobacco, jewelry, alcohol, cosmetics, and amusements. And the Plan is to operate for only a few years. The stakes are high and the probable returns on the investment are very great. Failure to act promptly and adequately, and even generously, would seem to me to be another evidence of lack of faith in our own strength, and very shortsighted.

My conclusion, therefore, from all these things which I have tried to say to you, is that our country has more than food and fuel; it has the basic vitality and ideology to justify our firm faith in its future. Our one danger lies in succumbing to doubts which can undermine this faith; doubts which are like molehills magnified in our minds into mountains as we worry about the inevitable problems

(Concluded on page 294)

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FOOD, FUEL, AND FAITH

(Concluded from page 292)

arising from the complexity of life in this postwar period of reconstruction. My hope is that the sons of M.I.T. will be distinguished for their effective faith in the basic principles and institutions which have made our country the "Sweet land of liberty."

And now for the more personal application to you individually of my text: "Food, Fuel, and Faith." Whether you are citizens of the United States or, as many of you are, citizens of some sister nation, you are graduating into a world where technology is needed and valued as never before. Whether in science or engineering or architecture, whether in business or teaching or professional practice, you should face your future with confidence.

I am tempted to say that you can face the world with the same confidence as was felt by the Christian gentleman who entered a poker game with four aces up his sleeve. Your first ace is the fact that you were picked to enter M.I.T. against heavy competition. Your second ace is the best education which could be given you by the best technological institution in the world. Your third ace is the continued interest and help which this institution will give you as Alumni. Your fourth ace is the world's need for men of your type of training.

So I do not worry about your ability to find food and fuel. You have every reason also to have faith in a future of satisfying achievement. My parting message to you as students and my first message to you as Alumni is, therefore, the assurance that the Corporation and Faculty of M.I.T. have faith in you.

I can think of no more appropriate way of ending this address than by quoting the text of another baccalaureate address to one of our graduating classes by Senator Saltonstall, then Governor of Massachusetts. This text expresses so well many of the things I have tried to say to you today, and it is well worth remembering from time to time as a recipe for a good life: "Look forward, not back; look upward, not down; and lend a hand."

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THE TECHNOLOGY LOAN FUND BOARD

REPORT FOR THE YEAR 1947

Current principal repayments during the year exceeded new loans made nearly *twofold*, and by December 31, 1947, 2,015 — nearly *three-quarters* of the 2,708 receiving loans since the Fund was established in 1930 — had completely discharged their financial indebtedness to it.

The data given below summarize the Fund's transactions during 1947 together with cumulative figures for the past seventeen years.

*Cambridge
March 1, 1948*

THE TECHNOLOGY LOAN FUND BOARD

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E. M. Baker,
T. P. Pitre,
B. A. Thresher,
D. L. Rhind, *Secretary*
H. E. Lobdell, *Chairman*

ITEMS OF OUTGO	<i>At Dec. 31,</i> <i>1947</i>	<i>At Dec. 31</i> <i>1946</i>	<i>Net changes</i> <i>during 1947</i>
Number of men receiving loans	2708	2647	+61
Total Amount Loaned	\$1,956,189.75	\$1,918,740.75	+\$37,449.00
Average per capita loan	\$722.37	\$724.91	-\$2.54
<hr/>			
ITEMS OF INCOME			
Number of men whose indebtedness has been completely discharged	2015	1922	+93
Principal repayments <i>in advance</i>	\$558,648.86	\$540,875.27	+\$17,773.59
Other principal repayments	\$1,032,494.40	\$979,983.79	+\$52,510.61
Total principal repayments	<u>\$1,591,143.26</u>	<u>\$1,520,859.06</u>	<u>+\$70,284.20</u>
Total principal matured, considering "advance repayments" as matured when paid	\$1,623,724.35	\$1,556,277.56	+\$67,446.79
Collection Ratio, i.e. percentage of total maturities paid	97.9%	97.8%	+0.1%
Matured principal in arrears	\$26,613.28	\$29,792.19	-\$3,178.91
Actual "written off" accounts	\$5,967.81	\$5,626.31	+\$341.50
Total maturities unpaid	\$32,581.09	\$35,418.50	-\$2,837.41
Interest received	\$215,835.59	\$208,239.87	+\$7,595.72
NOTES OUTSTANDING	\$359,078.68	\$392,255.38	-\$33,176.70

TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

Fortune on Funds

The February issue of *Fortune* contains a very illuminating article entitled "Alma Mater Asks for \$2 Billion." The problems of college financing today and the methods being taken to solve them are well presented. Although annual alumni funds are not a part of this article on major fund-raising campaigns, much of the thinking, if not the methods detailed, apply equally well to either one.

"The Commission on Higher Education in its recent report to President Truman set as a goal a system 'in which at no level will a qualified individual in any part of the country encounter an insuperable economic barrier' to a suitable education. . . . To achieve such a goal the American people would have to spend a lot more money on higher education than the present total. The budget might have to double, passing \$2 billion in 1952.

"Of course no such annual sum will be easily obtained. Endowment capital has not in many years accumulated as rapidly as enrollments have mounted, and in some sections of the country local and state appropriations inevitably and profoundly fail to meet needs. The commission, which approves the expansion of private (independent) institutions, proposes to increase resources by means of federal scholarships and fellowships applying to *all* institutions of higher learning, and by extensive federal aid for current and capital needs of *public* institutions. In any case, independent institutions will continue to seek private funds. More and more they may

have to look not to endowment income but to annual gifts. In recent years, however, they have faced stiff competition for this type of revenue from many welfare agencies. Hence a suggestion by the President's commission that fund-raising methods be strengthened and expanded. . . .

"One way or another, the independents are going to be hunting for private funds for a long time to come. They may use a shotgun or a rifle, or combine to operate with heavier weapons. They will in any case load with powerful arguments for the existence of independents in a system of higher education that is likely to include ever more and larger publicly controlled and financed units. Chiefly, they will stress diversity (institutions public *and* private, large *and* small, denominational *and* nonsectarian, etc.), high-quality teaching (individual attention), freedom to experiment pedagogically with resulting benefits to public education, and the liberty to do research as pure, scientifically, as can be conceived, which is not always demonstrably wise to public education officials who must think in terms of immediate pay-off."

Last year, according to the American Alumni Council, was the biggest year in the history of alumni funds. More than 345,000 alumni of American colleges contributed nearly \$8,000,000 to their support. When a third of a million men and women show in such substantial manner their willingness to take active part in furthering the progress of American educational ideals, the future seems bright indeed.

ALUMNI AND OFFICERS IN THE NEWS

Books

- » By 81 contributing scientists (including eight Nobel Prize winners) among whom we find JEROME C. HUNSAKER '12, ROBERT E. WILSON '16, BRIAN P. O'BRIEN '19, JOHN G. KIRKWOOD '29, KARL T. COMPTON, President, GEORGE R. HARRISON and FRANCIS O. SCHMITT, staff, *The Scientists Speak*, edited by Warren Weaver and published by Boni and Gaer, Inc.
- » By EARLE F. WATTS '20 and JOHN T. RULE '21, *Descriptive Geometry*, Prentice-Hall, Inc., 1946.
- » By NATHANIEL H. FRANK '23 and JOHN C. SLATER, staff, *Mechanics and Electromagnetism*, McGraw-Hill Publishing Company, 1947.
- » By ROSEMARY NORRIS KUTAK '27, *I Am the Cat*, Farrar, Straus and Company, 1948.
- » By ROBERT S. HARRIS '28, *Vitamins and Hormones*, Volume IV, Academic Press, Inc., 1947.
- » By RAYMOND D. DOUGLASS '31 and DOUGLAS P. ADAMS, staff, *Elements of Nomography*, McGraw-Hill Publishing Company, 1947.
- » By RAYMOND D. DOUGLASS '31 and SAMUEL D. ZELDIN, staff, *Calculus and Its Applications*, Prentice-Hall, Inc., 1947.
- » By ALVIN SLOANE '35, *Fundamentals of Engineering Mechanics*, Prentice-Hall, Inc., 1947.
- » By ROBERT W. MCKINLEY '40 as editor, the *IES Lighting Handbook*, published by the Illuminating Engineering Society in 1947 and containing contributions by the following Alumni: ARTHUR C. DOWNES '04, ELLIOT Q. ADAMS '09, DAVIS H. TUCK '11, ARTHUR C. HARDY '18, BRIAN P. O'BRIEN '19, GEORGE E. SHOEMAKER '21, EVERETT M. STRONG '22, MILES PENNYBACKER '23, JACK F. PARSONS '24, O. PHELPS MEAKER '25, O. HOWARD BIGGS '26, PARRY H. MOON '27, DAVID L. MACADAM '36, ROBERT R. WYLIE '37, DOMINA E. SPENCER '39, BERNARD F. GREENE '40, and GORDON G. MILNE '42.
- » By MARIE A. JAKUS '45, RICHARD S. BEAR, CECIL E. HALL, and FRANCIS O. SCHMITT, staff, with others, *Muscular Contraction*, published by the New York Academy of Sciences, 1947.
- » By LAWRENCE R. KLEIN '45, *The Keynesian Revolution*, MacMillan Company, 1947.
- » By JOHN J. ROWLANDS, staff, with pen-and-ink illustrations by HENRY B. KANE '24, *Cache Lake Country; Life in the North Woods*, W. W. Norton and Company, 1947.
- » By THOMAS A. JAGGAR, former staff, *Volcanoes Declare War, Paradise of the Pacific*, Ltd., 1947, and *Origin and Development of Craters*, published by the Geological Society of America, 1947.

Honors

- » For WILLIAM H. MCALPINE '96, who has received an honorary membership in the American Society of Civil Engineers for his work in inland waterway and flood control projects.
- » For VANNEVAR BUSH '16, who has been made a knight commander in the civilian division of the Most Excellent Order of the British Empire.
- » For RUDOLF E. GRUBER '16, who has been elected to fellowship in the New York Academy of Sciences in recognition of "outstanding work in the advancement of science."
- » For CHARLES A. THOMAS '24, who has been selected to receive the 1948 Gold Medal of the American Institute of Chemists.
- » For JAMES H. DOOLITTLE '24, who has been made this year's honorary fellow of the Institute of Aeronautical Sciences, "one of the highest honors the aviation profession can bestow." CARL F. BAKER '31 has also been elected to fellowship in the institute in recognition of his "valuable contributions to the advancement of aviation."
- » For HOYT C. HOTTEL '24, SAMUEL H. CALDWELL '25, and BENNETT ARCHAMBAULT '32, who have each received from Great Britain the distinction of His Majesty's medal for service in the cause of freedom.
- » For THOMAS R. CAMP '25, who was recently awarded the J. James R. Croes Medal by the American Society of Civil Engineers for a paper on "Sedimentation and the Design of Settling Tanks."
- » For JOHN H. HOLLOWOM '40, who has been presented with the 1947 Alfred Noble Prize of the American Society of Civil Engineers for his paper on "The Mechanical Equation of State," published in 1946 in *Metals Technology*, the society's official publication.
- » For JAMES R. MACDONALD '44, one of the six Phi Beta Kappa veterans of World War II who have been selected to represent the New England states as Rhodes scholars at Oxford, beginning in October, 1948.
- » For ROSS M. CUNNINGHAM, staff, who has received a citation from the American Marketing Association paying tribute to his service as president of that organization in 1947.

DEATHS

*Mentioned in class notes.

- CHARLES TERRELL '76, date unknown.
 WILLIAM N. KIMBALL '79, January 17.
 FRANK E. SHEPARD '87, January 1.*
 WILL S. ALDRICH '88, December 29.*
 JOSEPH C. SMITH '88, November 6, 1942.*

- WILLIAM H. DOW '89, January 31.
 SCHUYLER HAZARD '90, January 9.
 EUGENE A. HOLMES '90, May 17.
 ANNA M. GOVE '91, February 4.
 GAYLE T. FORBUSH '92, January 29.
 CHARLES R. WALKER '93, January 21.*
 ARTHUR C. HOLT '94, December 20.*
 VINTON S. PAESSLER '94, June 15, 1944.*
 S. LAWRENCE BIGELOW '95, December 3.*
 ROBERT M. CANNON '95, January 22, 1947.*
 WILLIAM B. FAVILLE '96, December 15.
 WILLIAM H. ALLEN '97, December 31.*
 FRANK H. PRESTON '97, June 15, 1946.
 HENRY M. SEAVER '97, December 9.
 J. WINTHROP TEWKSBURY '97, December 6, 1946.
 WINTHROP F. BUTLER '98, February 1.
 CHARLES J. SKINNER '98, in March, 1946.
 FREDERIC TAPPAN '99, July 25.
 HERBERT H. HOWE '00, December 13.*
 NEWITT J. NEALL '00, December 13.
 RICHARD WASTCOAT '00, November 23.*
 GEORGE I. CROSS '01, December 4.
 CECIL B. ANNELL '02, December 7.
 ARTHUR H. BERRY '02, January 5.
 JEREMIAH F. O'NEILL '02, January 13.
 JOHN C. COBB, JR., '03, January 1.
 GEORGE M. GREENE '03, February 8.
 E. GORDON BILL '05, November 28.
 RALPH K. FORSYTH '05, November 11.*
 EARLE F. KNOWLES '05, November 18.*
 HENRY C. MCRAE '07, December 21.*
 MARK E. KELLEY '09, February 2.
 LEO S. STONE '09 (see '08), January 12.*
 AUBREY H. STRAUS '09, November 6.*
 MAYNARD BRAMHALL '10, November 9.
 W. DEXTER EVERETT '10, November 19.*
 FRANCES STERN '13, December 23.
 L. STANDISH HALL '14, July 5.*
 VIRGINIUS E. CLARK '15, January 30.
 HAROLD E. NICHOLS '20, December 14.
 CARLETON H. TALCOTT '20, January 13.*
 DEAN F. WILLEY '20, January 23.
 JUSTIN F. JASON '21, November 11.*
 HUBERT M. GAULT '22, February 4.
 MARGARET ROBERTS '22, January 3.*
 HOWARD W. DEXTER, JR., '23, January 8.
 HERBERT H. FLATHER '23, January 23.
 WILLOUGHBY D. GUNDY '23, July 10.
 NEIL B. MUSSER '23, September 27.
 WILLARD N. PARKER '23, December 29.
 SCOTT ROSE '23, January 11.
 RAOUL R. GAMACHE '25, June 20.*
 GUSTAVE A. MARSH '25, August 11.*
 MOSES NAVISKY '26, September 21, 1946.
 ISAAC W. STEPHENSON '27, November 28.
 GEORGE A. SEITZ '29, October 24.
 LOUIS HANNAUER '32, September 22.
 WILLIAM R. POWER, JR., '32, November 3.*
 THOMAS A. MEADE '33, November 10.
 LEONARD STEARNS '38, January 4.
 WARREN B. GODDARD '39, August 24.
 CULLIE B. HARRIS '41, August 12.*
 ALEJANDRO MELCHOR '41, September 6.
 PAUL R. STONE '41, date unknown.*
 DANIEL J. DEGEN '42, January 7.*
 FRANCIS A. GEORGER, JR., '43, June 13.
 EDMUND C. NAAS '45, December 2, 1946.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Turkey Luncheon

The Review has received with interest two reports of an informal gathering of Tech men in Turkey. It seems that Joseph Pope '08, First Vice-president of the Stone and Webster Engineering Corporation, spent the month of September there. Arriving by plane, he was met at the airport by Ismail M. Tiner '44 "with the best of his English." Prompt discovery that they were both Technology graduates led to a luncheon assembling 10 other young Turkish Alumni — none of whom was even born, says the guest of honor, at the time he was graduated. This attendance, we understand, included practically the entire number now living in Ankara, and in this office we have their autographs, as each one signed a sheet circulated at the table, among the beer glasses in which the toasts were drunk — not real steins, reports Mr. Tiner, simply beer glasses. But no doubt the spirit was genuine. The occasion was recorded in a Kodachrome picture which unfortunately cannot be reproduced here. Participants, all of them holding degrees from the Institute, were as follows: Joseph Pope '08, XIII, İrfan Tümer '36, I, Enver Muradoglu (Muratzade) '38, I, Alaettin M. Aksoy '40, III, Hilmi F. Sagoç '40, III, M. Fikret Bebe '41, I, Ziya M. Kirman '41, XII, Kazim Ergin '42, XII, Sahap S. Kocatopcu '42, III, Muslihittin A. Tunca '42, X, Ismail M. Tiner '44, VI, and S. Suphi Yavasca '44, III.

M.I.T. Club of Connecticut Valley

On January 20 the Club met jointly with the Western Massachusetts Engineering Society and the Western Massachusetts section of the American Society of Mechanical Engineers for dinner at the Sheraton Hotel in Springfield, with Dr. Compton as the guest speaker. More than 350 members and guests enjoyed renewed fellowship with a delegation of 17 Hartford Club members. President Proulx '36 of the Hartford Club was introduced. A group of 12 guests and Alumni were given a handclap for having traveled a combined 800 miles from Lee, Mass., to be with us.

This meeting was by far the largest engineering meeting of any kind which has taken place in this region and was a token of the regard and respect of the engineers for the speaker and guest of honor, Dr. Compton. At the head table were seated the following: M. R. Edwards '22, Secretary of our Club; A. D. King '32, President of our Club; W. S. Mabb, President of the Western Massachusetts section, A.S.M.E.; Admiral Cluverius, President of the Worcester Polytechnic Institute; President Compton of the Institute; R. Wiser, President of the Western Massachusetts Engineering Society; Elden Shoup, executive director of the Brookhaven National Laboratory for atomic research of New York; Herman

Grimmeisen, program chairman; Ralph Curtis '15, Vice-president of the Western Massachusetts Engineering Society; Donald Bartlett, Secretary, A.S.M.E.; and Roland Packard, Past President, A.S.M.E.

Mr. Packard introduced Dr. Compton, who gave a most interesting and clear explanation of the history and application of radioactivity. The first discovery of radioactivity was made by Lord Rutherford in Cavendish Laboratory, England, in the same year the first automobile was developed in this country, but, unlike the case of the automobile, very little was done with the discovery until 1921, when Madame Curie produced the element radium from uranium ore and its use began for the medical treatment of cancer and for the illumination of watch faces and hands. Much laboratory work was done in the 10 years from 1921-1931, but no more applications were discovered until 1931, when again, at the Cavendish Laboratory, the neutron was discovered and the conclusion arrived at that it was the neutron which produced the chain fission reaction under bombardment. With Ernest Lawrence's invention of the cyclotron to bombard particles, rapidly about 400 new radioactive elements were produced in the years up to 1940. In 1939, Strassmann and Hahn in Germany actually broke down the atom of uranium to produce barium and a release of energy as a by-product, an achievement which began the scramble in Italy, Germany, Japan, Russia, Canada, and the United States, all working for mastery of the process as a weapon. Most of the countries, including Japan and Germany, did research to produce a power plant for submarines, and at the time of the surrender both Germany and Japan were well started in this project, but the bombing of Tokyo destroyed the Japanese laboratories, and Russia took the German laboratories. In the United States at Tuxedo Park, Private Conferences took up the subject of atomic energy in 1940; a group of bankers headed by Alfred Loomis donated the first \$40,000 to launch the atomic project, which during the year was taken under Federal sponsorship, directed by Vannevar Bush '16 under the National Defense Advisory Commission; and the Manhattan Project, which produced the atomic bombs, was thus finally inaugurated.

It is interesting to note that the power of the atomic bombs dropped on Japan was equal to that released by 20,000 tons of T.N.T. and that the volume of the uranium (235) used in producing that power was the size of a silver dime. Another interesting comparison is that a piece of atomic bomb fuel the size of a man's head will generate the same amount of power as that produced by the Detroit Edison Company in furnishing electric power for the entire Detroit area in one full year. Dr. Compton concluded by stating that at present there is no danger of atomic power's supplanting coal or other fuels, as it would cost about twice as much to produce power by atomic energy as by fuels in present use; but he added that

atomic research is now at the stage where automobiles were in 1900, and no one can predict what discoveries will be made in the future to lessen the cost of obtaining the radioactive elements for fission purposes, which is the greatest expense. At present, there are four laboratories in the United States working actively and continuously on atomic energy, but unfortunately most of the work is in the direction of weapons for war rather than commercial applications.

Our President King thanked Dr. Compton for his interesting talk and announced that the next meeting would be held in Holyoke on Wednesday, March 17, St. Patrick's or Evacuation Day. At the present time, there are approximately 345 Alumni in the Connecticut Valley, and the club officers invite all to participate actively in the Club by continued attendance at meetings. At the March meeting the President will appoint a nominating committee for 1948-1949 officers. — MINOT R. EDWARDS '22, Secretary, Holyoke Heater Corporation, 54 Waltham Avenue, Springfield 9, Mass.

M.I.T. Club of Chicago

The second meeting for 1947-1948, designated as Navy Night, was held in University Hall at the Chicago University Club on December 8. Some 65 members and guests attended. Seated at the head table were the following: Vice-admiral Edward L. Cochrane '20, our speaker, who has recently been placed in charge of the Department of Naval Architecture and Marine Engineering at Technology; Pierre Lavedan '20, President; William Steinwedell '25, Past President; Stanley Humphrey '28, Secretary; Richard Meyer '42, Treasurer; John Praetz '28, chairman of the meeting; Edmund Farrand '21; Benjamin Sherman '19, dinner chairman; Edward Brooks '17; Sherry O'Brien '17; Robert Wilson '16; John Barriger '21; and Charles Toll, Jr., '23. Ben Sherman had charge of the dinner arrangements, with the assistance of Ed Farrand. The naval angle was well represented by two guests in addition to our own Navy members — J. J. Godfrey, a former naval lieutenant, and Bill Green, formerly of the British Navy.

President Lavedan conveyed his plans for the next two meetings. They included an all-fun program for early in February and the Compton dinner for Thursday, April 22, a date we hope you have already reserved on your calendars. Admiral Cochrane, whose outstanding war service is familiar to most of us, was then introduced. By virtue of his Technology connection, ranging in status from student to staff, as department head, and of his 37 intervening years in the Navy, he spoke with authority on "M.I.T. and Sea Power." He maintains that the Institute may be very proud of its leadership in ship-building during World War II, in that a substantial number of graduates of the Course in Naval Architecture guided design and engineering for the Navy. He stressed the broad scope of Navy training and operations, combining sea, air,

and undersea warfare, and the importance of air training such as was accomplished by the baby carriers on the Chicago waterfront during World War II. He discussed frankly his views on events leading to Pearl Harbor and his experiences and observations there immediately after the attack. He also gave us enlightening glimpses of his work as naval attaché at the American Embassy in London during the very serious situation existing in late 1940.

It is the Admiral's feeling that airplanes will never replace supply ships in the transportation of heavy commodities of war and that substantial naval power and facilities will always be tremendously important for this country. He believes heavy Navy guns to be obsolete, superseded by competent air power.—**STANLEY M. HUMPHREY '28**, Secretary, Booz, Allen and Hamilton, 135 South LaSalle Street, Chicago 3, Ill.

M.I.T. Alumni Association of Cleveland

The annual alumni-student luncheon held at the University Club on Saturday, December 27, was a truly happy occasion for those of us who were able to attend. In the first place, it seems appropriate to have an alumni luncheon at the University Club when possible. The atmosphere resembles that of campus life and serves to create a mood of good fellowship. We try to arrange our annual meetings there and hope to be more successful in the future. The Christmas week invitation luncheon has as its purpose the introduction of current Cleveland M.I.T. students to the local Alumni Association. We hope to make it a stepping-stone from Technology to an alumni association in the neighborhood of the graduate's work. Then too, the meeting with the students provides an insight into current student life impossible through anyone other than the actual students. This luncheon brought us some rich descriptions, enhanced by good extemporaneous speaking on the part of men such as W. R. Zimmerman '48, J. D. Winninghoff '49, F. F. Miskell '49, and others.

All told, 21 students and 28 Alumni attended, as follows: R. W. Asmus '48, C. D. Axelrod '48 (University of Oklahoma '47), W. W. Barton '48, A. I. Bradley '21, R. O. Braendle '44, W. A. Cleaveland '98, R. T. Craig '49, F. W. Crosby '90, V. deV. de Olloqui '40, T. R. Eggert '50, H. P. Ferguson '27, L. D. Fykse '41, J. L. Ganger '50, A. A. Gould '10, R. E. Hare '51, E. O. J. Helland '40, H. E. Hendershott, Jr. '49, J. H. Kellogg, Jr. '48 ('45), Hall Kirkham '23, H. J. Lehman '24, H. W. Mergler '45, C. O. Miller '49, F. F. Miskell '49, J. H. Morgenthaler '51, P. L. Nies '49, M. M. O'Brien '32, E. J. Pratt '27, W. A. Rajki '51, W. H. Robinson, Jr., '24, B. D. Ross '49, E. T. Schoenwald '44, W. C. Sessions '26, P. W. Skove '48, C. H. Smith, Jr., '42, R. H. Smith '23, T. E. Stanton '27, E. E. Staples '26, J. C. Staples '50, W. R. Stern '40, William Tobocman '50, S. K. Taylor '45, W. R. Taylor, Jr. '40, E. H. Weil '13, T. E. Weil '49, J. D. Winninghoff '49, W. J. Winninghoff '14, F. H. Wood '22, G. R. Young '37, and W. R. Zimmerman '48.

We have been able to arrange for a visit by our capable and respected Executive

Vice-president, James R. Killian '26. A dinner meeting and reception for him are scheduled for March 4 at a place yet to be selected. We hope to have a panel of outstanding Alumni with us for that event but cannot divulge our plans for the reason that we may not have the good fortune to see them materialize. Your committee nevertheless takes its modest bow for honest intent.—**G. R. YOUNG '37**, Secretary, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

M.I.T. Club of Southern California

H. E. Lobdell '17, Executive Vice-president of the Alumni Association, was the guest speaker at an enjoyable dinner held at the Rodger Young Auditorium on January 16. His subject was "The Present Student Body and Plans for the Future of M.I.T." About 20 Alumni were encouraged to ask questions, which were very satisfactorily answered by Mr. Lobdell.

New officers elected were Philip K. Bates '24, President; Helmut W. Geyer '26, Vice-president; Hiram E. Beebe '10, Secretary; and George M. Cunningham '27, Treasurer. Raymond B. Stringfield '15 was appointed by President Bates in charge of replacement, and Mr. Sammis was given a vote of thanks for his excellent work of the past two years.

Members present were the following: R. L. Alder '37, C. G. Apley '31, R. B. Atkinson '29, P. K. Bates '24, H. E. Beebe '10, R. H. Boden '34, R. S. Breyer '10, R. W. Chandler '12, G. M. Cunningham '27, Jack Delmonte '34, C. C. Dubbs '35, P. C. Eaton '27, S. G. Eskin '26, R. R. Favreau '45, Karl French '26, J. D. Goldson '47, F. G. Harmon '23, J. B. Henderson '37, Rockwell Hereford '24, D. M. Hughes '15, R. H. Hutzler '40, David Jacobson, Jr. '41, H. S. Johnson '12, K. D. Kahn '15, R. M. Kallejian '16, R. H. Kauffman '39, J. L. Kaufman '44, Alexander Kazutow '35, J. H. Leary '36, I. B. McDaniel '17, W. P. McNulty '48, William Mellem '15, F. B. Morton '13, L. A. Parker '06, J. B. Pitkin '37, F. M. Post '21, J. W. Reis '19, W. B. Rivers '15, J. J. Robson '32, D. S. Saxon '41, P. P. Shelby '32, H. E. Shoemaker '29, R. B. Stringfield '15, K. M. Sully '16, T. J. N. Taylor '24, J. J. Wallace '38, C. O. Walton '13, G. L. Way '34, D. D. Weir '38, Robert Welles '15, P. H. Wilson '24.—**HIRAM E. BEEBE '10**, Secretary, 1847 North Wilcox Avenue, Hollywood 28, Calif.

M.I.T. Club of New York

We have not yet reported upon the grand success of the Compton dinner, held at the Biltmore Hotel on December 9. More than 500 loyal Alumni turned out for the occasion; hence it is impossible to list them herein. A picture of the occupants of the head table appeared in the Institute Gazette for February on page 216. In February, also, references to the dinner were made under the notes of several classes, namely 1897, 1909, 1914, and 1919. Among the celebrities seated at the head table were the following: Dr. and Mrs. Compton, Gordon Rentschler and Mrs. Rentschler, Alfred P. Sloan, Jr., '95, Gerard Swope '95, Senator Desmond '09 and Mrs. Desmond, H. E. Lobdell '17, A. L. Loomis '36, Mrs. Dandrow and Mrs. Rundlett. Our charming

and honored guest, Mrs. Compton, was presented with a token of our gratitude for her presence.

Dr. Compton's terse and lucid outline of the needs and plans for higher education was most interesting. Needless to say, he did a masterful job of presenting the information and his own ideas. Without any question, this dinner was the highlight of the season's entertainments, and both President Rundlett '22 and Past President Dandrow '22, chairman of the dinner committee, are to be congratulated on the laborious planning and smooth execution of the entire affair. Upon conclusion of the scheduled events, the classes of '22, '23, and '24 collected a sizable group in the Bowman Room to top off the affair with dancing and conviviality.

Your Secretary notes that Lobbie Lobdell '17 has been doing some extracurricular work, organizing an M.I.T. Club of Fairfield County, Conn. They were to have their first winter dinner meeting at the Hotel Barnum in Bridgeport, Conn., on January 29, and your Secretary, when this was written, planned to be on hand. With our old associate, Don Carpenter '22, as one of its sponsors, this was bound to be a worth-while event. Our Club wishes the Fairfield County Club a most successful future. But we trust it will not dim the enthusiasm of those who find themselves in New York and wish to keep in touch with activities at the Institute.

Your board of governors has held several meetings, at the last of which much discussion was held and plans made to investigate further the possibilities and desirability of obtaining the Flagg estate. It was recommended that the matter be submitted to the Institute for consideration and advice.

We are planning to issue another of our news editions to all Alumni in Greater New York for whom we have a suitable address, and John Austin of the Architectural Forum has assumed the task of getting it out. We hope to have it in your hands perhaps before you read these lines, provided the various committee chairmen will come through with their assignments. We hope that all who receive copies of this news will find it interesting and will be a bit inclined to see more of us and become regular members or frequent visitors, anyway.

The bridge tournament got under way in January, under the able direction of Mike Radoslovich '26. Much credit is due to Mike for getting this undertaking going again. Some 14 members have signed up for it, and I understand the interest is running high.—The annual luncheon for the M.I.T. members of the American Society of Civil Engineers was held at the Commodore Hotel on the 22d of January. Bud Wilbur '26 and Professor Breed '97 along with other active Alumni, were present, totaling about 90 attendants.—We are continuing to hold a meeting of some kind about once a month. The annual golf outing will be held in June, and the place will be announced in the News Edition.

Our membership continues to hold its own at 409 and in fact is a little ahead of what it was at this time last year. We need about twice the number of members we now have to undertake to operate our

own clubhouse, but aside from that we need a constant flow of members to fraternize and become better acquainted with one another.

We regret to announce the passing of Frank L. Perin '79 on October 15, Dan Adams '05 on December 1, Fred C. Batchellor '14 on August 24, and George F. French '19 on October 24.—Dick Holt '24, Miles Pennybacker '23, and Charlie Roll '22, have found it advisable to submit their resignations; but we hope to have them back with us before too long.

We have instituted a new practice, namely that of including on our mailing list Alumni who are not club members. If you wish to inform us of your desire to receive a copy of our regular notices concerning meetings, please notify your Secretary or Lou Bruneau '38, our most efficient and enthusiastic Assistant Treasurer.

Again, let me remind you that both Ray Rundlett and I are glad to be of service to any of the visiting firemen or members whenever we can. Ray is at 292 Madison Avenue (with the Curtis Publishing Company), and I am still at the same old stand. Class Secretaries and others are reminded that the Architectural League is available for luncheons and dinners, merely by calling Mrs. Pedrick in advance. We urge each and all of you to take advantage of this privilege and feel reasonably certain that you will not be disappointed in so doing. We cannot urge each of you too much to show more interest in your Alumni Association and Club, which will not only provide you with diversion and cement the bonds of fellowship made during our college days but will also maintain and raise the prestige of M.I.T.—WILLIAM W. QUARLES '24, Secretary, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

Niagara Falls M.I.T. Club

William H. Hope, Jr., '36 of Moore Business Forms was elected president, and Arnold Arch '40 of the Isco Chemical Division was elected secretary, at the annual Christmas dinner at the Niagara Falls Country Club on December 18. Jim Neal '15 of the Norton Laboratories of Lockport, Past President, presided at the meeting, and apologized for not having had a meeting called in two years. The 18 members present, however, agreed that the affair was so well organized that it was worth waiting for. The new regime has already been planning an ambitious program for the new year with a potential of four meetings in the form of picnics, dinner dances, and such, on the agenda. A. W. Hosig '23 of National Carbon Company turned the files over to the new secretary with the perennial 36 cents still sealed in an envelope that was last opened in 1936.—ARNOLD ARCH '40, Secretary, 910 Vanderbilt Avenue, Niagara Falls, N.Y.

M.I.T. Club of Philadelphia

Tuesday, January 20, was the day on which the Philadelphia Alumni of M.I.T. gathered at the Bellevue-Stratford Hotel for their annual winter meeting. One hundred and ten members and guests from our total membership of 297 were on hand to elect a new slate of officers headed by Henry

S. Dimmick '22, who will be our president for this year.

Those present heard William L. Batt, Sr., President of SKF Industries, give his views of the European aid problem. Although his topic is a very controversial one, even those who did not agree with him could not help feeling the sincerity and thoroughness that characterized his approach to the problem and the conclusions he reached. Another speaker was George E. Whitwell '14, Vice-president of the Philadelphia Electric Company, who presented his company's approach to the sales problem confronting utilities.

Arranged by classes, the following is a list of the members who attended this meeting: 1900: L. A. Miller; 1905: C. A. Anderson, Renshaw Borie, R. H. White; 1906: W. J. Walsh; 1907: H. W. Mahr; 1912: H. H. Hanson, H. C. Mabbott; 1913: R. W. Weeks; 1914: A. P. Kitchen, G. E. Whitwell; 1915: H. W. Anderson, H. F. Daley, K. T. King, E. A. Whiting; 1916: O. B. Pyle, E. A. Weissbach; 1917: J. J. Basch, K. L. Harper, R. A. Pouchain, H. S. Toole, R. G. E. Ullman; 1918: O. D. Burton, C. A. Lindgren, Jr.; 1919: H. F. Marshall; 1921: J. E. D. Clarkson, T. A. McArn; 1922: P. M. Alden, C. T. Chu, H. S. Dimmick, Joseph Greenblatt, H. F. Metcalf, C. W. Stose; 1923: R. L. Hershey, R. G. Rincliffe; 1924: R. E. Reid; 1925: R. E. Cernea, C. B. Weiler; 1926: J. O. Crawford, J. Q. du Pont, Howard Humphrey, H. W. Jones, K. S. Lord, F. E. Washburn; 1928: R. M. Harbeck, G. N. Janes, H. F. Lathrop, E. S. Petze; 1929: G. T. Logan, V. G. Miskjian, V. E. Ware, C. B. Wooster; 1930: A. S. Ackiss; 1931: A. D. Bertolett, J. L. Dodson, H. S. Smith; 1932: E. E. Burritt, Jr., F. S. Chaplin, C. D. Cummings, John Lawrence, M. T. Meyer; 1933: C. E. Fink, H. G. Lees; 1934: C. L. Grahn, Proctor Wetherill; 1935: G. R. Bull, Jr.; 1936: J. A. Myers, R. E. Worden; 1938: D. P. Burleson, C. E. Mullins, R. C. Eddy; 1939: W. F. Corl, Jr., R. L. Graff, B. A. Kleinhofner, F. W. Tobin; 1940: R. D. Gerges; 1941: C. W. Hargens, S. K. McCauley, H. R. Moody, J. S. Thorton; 1942: J. N. Evoy, Jr., E. W. Smith, Jr.; 1943: L. A. Benson, Jr.; 1944: V. S. Ezykowski, R. G. Fisher; 1945: A. F. Hahn, L. J. Russo, M. L. Schoenberg, H. L. Swan; 1946: C. J. Fisher, W. H. Peirce; 1947: Edmond Engle, J. J. Ferencsik, J. H. Hanson, P. A. Knudsen, R. A. Lombard, Bernard Morrill, A. M. Naulty, and Cyrus H. Warshaw.—SAMUEL K. McCUALEY '41, Secretary, 288 Copley Road, Upper Darby, Pa. WILEY F. CORL, JR., '39, Assistant Secretary, Box 532, Bryn Mawr, Pa.

M.I.T. Club of Western Pennsylvania

The fourth monthly meeting for 1947-1948 was held at the University Club in Pittsburgh on the evening of December 15. The meeting was attended by 34 members, an excellent turnout considering that the weather conditions were most unfavorable.

The members began assembling shortly before 6:30 P.M. to enjoy a period of informal good fellowship prior to the excellent buffet dinner. After dinner, President Lafean '19 conducted a short business meeting

and then turned the floor over to George M. Hoffman '28, entertainment chairman. Hoffman introduced three motion pictures made available through the courtesy of the Westinghouse Electric Corporation. These pictures presented the story of electronics, covering the functions of the electronic tube, the industrial and research applications of the electronic tube, and the story of broadcasting. The question period after the meeting was ably handled by George with some assistance from the floor.

Those present were as follows: W. C. Allen '33, H. M. Baker '30, C. T. Barker '27, E. M. Barnes '23, W. K. Bodger '40, J. G. Burke '38, E. L. Chappell '24, G. I. Clark '41, C. N. Cresap '42, F. L. Current '37, E. F. Dandrow '41, D. W. Dimock '28, William Goodridge '26, H. D. Hoffman '27, G. M. Hoffman '28, A. J. Hoffmeister '46, B. M. Hutchins '32, R. G. Lafae '19, Raymond Mancha '26, A. T. Mason '33, G. A. Morrison '09, L. M. Moses '32, E. F. Murphy '41, A. H. Orr, Jr., '32, E. K. Owen '41, C. F. Peck, Jr., '41, H. M. Priest '12, G. N. Reed '23, P. M. Robinson, Jr., '44, Henry Rockwood '32, R. J. Schaefer '43, E. A. Soars '21, J. J. Strachan '13, and P. R. Toolin '39.—WILLIAM J. BATES '35, Secretary, 141 Woodhaven Drive, Pittsburgh 16, Pa.

M.I.T. Club of Rochester

Community planning at the Institute was discussed by Professor Erwin H. Schell '42, head of the Department of Business and Engineering Administration, at an informal luncheon with some of our members on December 9. Professor Schell was in Rochester for an address that evening to the Foremen's Club of the Eastman Kodak Company, and his schedule permitted a luncheon with some of the local Alumni that noon.

Considerable interest and effort is now being devoted to the proper development of community life at the Institute. Schell pointed out that with more than 5,000 students, and with the additional numbers on the Faculty and staff of the Institute, M.I.T. is now a sizable community rivaling in magnitude many smaller towns. Under the leadership of Dean Baker, the new Dean of Students, effort is being made to develop community social life to the mutual advantage of the students and staff. One feature of this new program was the Tech-a-Poppin social week end, which included a basketball game, dances, and a beauty contest at which Dr. Compton was one of the judges.

Another recent activity aimed at better-rounded community life is the visiting lecturer program, in which Robert Frost gave the first talk on science and poetry. His opening session was jammed with at least four times a capacity crowd, while he explained to the boys that poetry is an exact science and other things, such as chemistry and physics, are ethereal. Following his opening lecture, he had 30 solid evenings of discussion with various small groups, and the demand for meetings with him and meetings with similar men in other fields of broader interest has been intense. Further manifestation of the community endeavor is the initiative shown by the student body in searching out for themselves vocational gui-

dance information, experience in getting along with people, and broadened interests.

Another phase of community planning is in the hands of a committee studying the integration of new physical facilities up and down the river. An integrated plan of facilities is being prepared with the various areas allocated to specific purposes such as education, research, sports, housing, and so on. This ground planning has extended so far as to incorporate the improvement of the vista from offices overlooking the rear of the Institute, with the cleaning up of certain parts and even the introduction of landscape planning.

As the third phase of community planning, the Committee on Educational Survey under the chairmanship of Professor Warren K. Lewis '05 is investigating the educational objectives of the Institute. A number of preliminary reports have been presented to the Faculty so far, but the final report is not expected before the lapse of about two years. This committee's objective is to examine the Institute's educational obligation to its students and to outline a procedure for best meeting this obligation. Particularly in the past few years, it has become evident that the Institute's world renown is bringing outstanding men into its entering class; as the quality of the students rises, the responsibility for turning out men of well-rounded capabilities, fit to assume positions of leadership increases. Therefore, this Faculty committee is considering what may be done to train those outstanding men to be real leaders, and to avoid the production of narrow graduates with abilities in but a single field who are not qualified to make a real contribution to society.

The present student body, Schell said, is outstanding in all respects and will probably not be duplicated in the years to come. These men are, for the most part, veterans of the war, who have had their educational training interrupted. Now, at graduation, they bring the increased maturity of their years and experience together with the latest word in scientific training. This combination is so in demand in industry that competition for these graduates is at the highest level ever seen. The large number of married students, together with their unexpectedly good scholastic record, may be the forerunner of a new sociological trend with education woven into the family fabric. Indications so far are that this combination of education and Institute community life with family life is satisfactory in all respects.

Speaking that evening before the Eastman Kodak Foremen's Club, Professor Schell discussed the underlying currents influencing the sea of business affairs. Present difficulties, Schell pointed out, cannot logically be attributed to a single person, a single administration, or even a single country — since the outstanding features are world-wide and are observable in all countries. These currents, as outlined by Schell, are as follows: (1) A more rapid industrial obsolescence, (2) A decrease in the efficiency of financial wage incentives, (3) A decrease in the extent of executive authority and a change to executive persuasion, (4) A change in the public attitude with the realization that great businesses are social as well as economic structures, (5) The realization that

industry in the future must support certain new costs such as increased government activity.

The following men were present at the luncheon meeting with Professor Schell: Collin H. Alexander '39, Peter Barry '34, Malcolm A. Beers '47, Alfred E. Castle '40, Raymond A. Dunn '43, Harry E. Essley, Jr., '36, Edward S. Farrow '20, John S. Goldey '43, George Gustat (guest), John Hodgkins (guest), Frederick J. Kolb, Jr., '38, Harold H. Leary '23, Kenneth J. Mackenzie '28, Thomas Misenville (guest), James H. Rial, Jr., '47, Daniel E. Suter '38, Cyril J. Staud '24, George E. Wingate '26, Clarence L. A. Wynd '27, George E. Yeomans '41. — FREDERICK J. KOLB, JR., '38, Secretary, Building 14, Kodak Park, Rochester 4, N.Y.

M.I.T. Alumni Association of Utah

Our Association held its first meeting of the year on January 9, to welcome H. E. Lobdell '17, Executive Vice-president of the Alumni Association, who paid us a welcome visit while on a western trip. A dinner was held at the Newhouse Hotel during which Mr. Lobdell gave us a most interesting résumé of recent Institute history. The new building programs, future projects, entrance requirements, curricular activities, financial help to deserving students and war veterans' housing projects were discussed, while the ever humorous idiosyncrasies of students and professors were enlarged upon with gusto.

In the temporary absence of our President, G. M. Gadsby '09, David D. Moffat, Jr., '41, conducted the meeting and introduced Mr. Lobdell to the Alumni. During the course of the evening elections were held and Mr. Gadsby was unanimously re-elected president of our Association for the coming year and empowered to select a secretary-treasurer upon his return. We enjoy the visits of staff members, and their appearances are a means of holding welcome gatherings in the spirit of good fellowship which we, here, too seldom enjoy. — MARVIN P. EGGLESTON '31, Secretary, University Club, 136 East South Temple Street, Salt Lake City 1, Utah.

M.I.T. Club of Schenectady

The Club met at the Young Men's Christian Association on January 14. Approximately 50 members and their wives and friends attended.

Before the principal speaker of the evening was introduced, a short business meeting was held. Scholarship committee activities were reported by Bill Rodemann '44. The committee has completed a plan for increasing the funds available for scholarships in the Schenectady area. A résumé of the scholarship committee's plan was given, and methods of raising money were discussed. Our club activities are directed toward helping well-qualified young men who require financial assistance to get started in an engineering career. A circular is being sent to the members so that they may indicate their interest in activities for raising funds. A business meeting will then be held at which all ideas may be tossed out on the table for discussion and further action taken.

William D. Coolidge '96, Director Emeritus of the General Electric Research Laboratory, was the principal speaker. He

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presented a very enlightening talk on his trip to Japan last summer. The speaker made use of colored slides to bring out the high points of his travels.

Those attending, many with their wives, were the following: R. W. Austin '42, E. H. Bancker '18, C. F. Barrett, Jr., '34, F. W. Baumann '33, D. C. Berkey '42, H. R. Brown, Jr., '43, Harold Chestnut, '39, I. W. Collins, Jr., '41, W. T. Cook '24, W. D. Coolidge '96, L. H. Dee '35, S. B. Dunham '42, L. J. Goldberg '26, E. B. Judd '42, R. B. Nelson '38, W. B. Rodemann '44, J. A. Scott '21, R. W. Stanhouse '41, Andrew Vogel '13, R. M. Ilfeld '44, J. A. Kohn '41, J. S. Lukesh '36, J. J. Hanlon '37, J. P. Mills '33, and R. J. Saunders '39. — JOSEPH S. QUILL '41, Secretary, 226 Jackson Avenue, Schenectady 4, N.Y.

CLASS NOTES

1887

It was a great surprise when your Secretary received a letter from David Shepard '26 announcing the death of his father, our classmate Frank Shepard, on January 1. He had been in remarkably good health for his 82 years. Denver, that mile-high city, has a reputation for health. To quote his son: "In family conference over the past few years, we considered whether or not we ought to seek to influence my father to retire, but we always concluded that his interest, energy, and pleasure in his work of designing mining and ore-dressing equipment were so great that it would be a mistake to endeavor to convince him that he should take up a less active life. I think this was the right conclusion because my father retained his very active interest in his profession and in other things to the end, and I am sure he would like us to remember him as finishing his job with his boots on."

Frank's interest in Technology and in his Class was always great, as we all know. He certainly enjoyed the reunions he was able to attend. His wife is still at 1120 East 10th Avenue in Denver, and his son Richard is also in Denver. His daughter, Mrs. Burton E. Martin, is in Japan with her husband, who is helping to re-establish an educational system there. His son David was of the Class of 1926 at M.I.T.

As you know, the Class now operates with but two officers. The President, Richard E. Schmidt, is and has been a resident of Chicago for 81 years and is still active. Your Secretary's permanent home for the past 57 years has also been Chicago, although he spends four months of the year in Fort Myers, Fla. Any first-class mail sent to Chicago is forwarded to him at the Bradford Hotel in Fort Myers. — LONSDALE GREEN, Secretary, 5639 Kenwood Avenue, Chicago 37, Ill.

1888

Your Assistant Secretary, Sanford Thompson, and Mrs. Thompson are spending the winter at Clearwater, Fla. In recognition of his long service in the development of concrete and the use of concrete aggregates, Sanford has been selected an honorary member of Committee C-9, on concrete and

concrete aggregates, of the American Society for Testing Materials. The committee was formed by Colonel Thompson in 1914; he served as the first chairman for several years and as a member since then. Several years ago, the committee established the Sanford E. Thompson Award, which is presented annually to the author of the best paper on concrete.

Joseph Cooke Smith, V, died on November 6, 1942. Smith had not been heard from for the last five years. In 1908, he was reported as retired at Champéry, Valais, Switzerland. The Review of January, 1919, stated that he had worked two years for the French Red Cross and was for a time with the Duryea War Relief Committee in the war zone. For the previous year, 1918, he had been with the American Red Cross in different parts of France and in the Prisoners of War Department at Berne, Switzerland. In 1924, his address was in care of the Brown, Shipley and Company, 123 Pall Mall, London. These few facts are all we can find out about our classmate Joseph Smith, with whom your Secretary communicated in Switzerland in 1908.

Will Stine Aldrich, a partner in the architectural firm of Eckel and Aldrich, died on December 29 at his home in St. Joseph, Mo., where he had been seriously ill for several years. He is survived by his wife and daughter and one grandson. Born in Chicago, Aldrich was reared at the home of his grandfather in Freeport, Maine. He left the Institute at the end of his junior year and worked for two years with a firm in Portland. After a summer abroad, he entered the employ of McKim, Mead and White, then designing the Boston Public Library. Later he worked with Peabody and Stearns on the World's Fair Buildings. In 1895, he won the Rotch Traveling Scholarship in Architecture, which accorded him three and a half years of travel and study in England, France, Italy, and Greece. During this period he was director for a year of the American Academy of Fine Arts in Rome. On his return he began work for Lord, Hewlett and Hull of New York. From 1899-1902, he practiced architecture in Boston and from 1903 until 1910 he was again with McKim, Mead and White in New York and handled some of their large commissions, such as designs for the Bellevue Hospital and the New York municipal office building and additions to the Metropolitan Museum and Brooklyn Institute of Arts and Sciences.

In 1910, he joined Edmond and George Eckel in St. Joseph, Mo., one of the oldest firms of architects in the country, which designed in St. Joseph the News-Press and Gazette Building, the City Hall, the placing and background of the Pony Express statue, the Zion Evangelical Church, the Central High School, St. James Catholic Church, the R. E. Townsend mausoleum in Mount Mora Cemetery, the infirmary at State Hospital No. 2, and numerous fine homes. Out-of-town commissions of importance were the courthouse at Maysville, Mo., the high school at Savannah, Mo., the municipal building at Columbia, Mo., a laboratory and school building at the School for the Deaf, Fulton, Mo., the Tacoma Hospital at Rolla, Mo., and the National Biscuit Company bakery in Los Angeles.

Stamp collecting was Aldrich's hobby and "at one time," says the St. Joseph News-Press, "he was regarded as a leading dealer in postage stamps for collectors. Virtually all his business was handled by mail. So thorough was his knowledge of philately that he was often called on to appraise stamp estates. About 25 years ago he purchased one of the largest stocks of British empire postage stamps held in the United States." Aldrich married twice — Bertha May Dennison in 1891 and Lucile S. Goerner in 1919 — and had one daughter. He was a member of the American Institute of Architects, of Christ Episcopal Church in St. Joseph, and a life member of the Elks. In earlier years he was active in Rotary and before his illness belonged to the Benton Club and the Country Club in St. Joseph. — BERTRAND R. T. COLLINS, Secretary, 291 Nassau Street, Princeton, N.J. SANFORD E. THOMPSON, Assistant Secretary, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 16, Mass.

1890

The Brighton Mass., Citizen recently ran a very interesting story about the ancestry of our classmate Lyman Otis Warren, and how Warren Hall, Warren Street, and the Warren Building received their names, the ancestors having fought in the Indian Wars and the Revolution, and later having established the first drugstore in that section. Warren practiced his profession for a short time after graduation but has been more or less of an invalid for many years. He has a broad philosophical outlook on life, however, and continues to get considerable joy in living. He has one son, Lyman Otis, Jr., who was graduated from Harvard Medical School and, having been recently released from the Army, is beginning the practice of internal medicine in Maine.

Once more William P. Flint has returned to St. Petersburg, Fla., for the winter. His address this season is 3726 First Avenue North. — GEORGE A. PACKARD, Secretary, 53 State Street, Boston 9, Mass. HARRY M. GOODWIN, Assistant Secretary, Room 3-233, M.I.T., Cambridge 39, Mass.

1893

After a long illness, Charles Richard Walker died at a nursing home in Waltham, Mass., on January 21. Funeral services were held January 23 in the Story Chapel at Mt. Auburn cemetery, Cambridge. He entered the Institute with the Class of '88 but was obliged to withdraw on account of severe illness. Returning after spending some time in outdoor engineering work, he completed the Course in Chemistry and was graduated with our Class in '93. Up to the time of our 30th anniversary, the class record shows that he had held the following positions: chief chemist of the Eastman Kodak Company in Rochester, N.Y.; chemist and superintendent of the General Chemical Company at various locations; superintendent of the National Tire Company at Elizabeth, N.J.; as well as chemical engineer for the Barrett Company at various locations. When World War I began, Walker was employed as assistant superintendent of the Warren Chemical Products Company, Warren, Pa., later known as the Aetna Explosives Com-

pany. Subsequently he became manager of the Nitro Powder Company of Kingston, N.Y., manufacturers of T.N.T., dynamite, nitroglycerin, and other compounds. After the war, he formed the Conewango Chemical Company of Warren, Pa., for the manufacture of nitrocellulose products. In 1923, he was connected with the Weymouth Art Leather Company and affiliated companies, remaining with them until he retired.

Walker had been particularly interested in photography, geology, and mineralogy and had visited many mines in the United States, Mexico, and Central America. He was a member of the American Chemical Society, the Society of Arts, the former Electrochemical Society, and the National Geographic Society. On June 12, 1918, he married Anne S. Heywang, who died in Braintree in 1935. He is survived by two brothers, Clifford H. Walker, attorney of Newton, and Dr. William H. Walker of Newtown, Conn., and two nieces. — FREDERIC H. KEYES, Secretary, Room 7-211, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston 16, Mass.

1894

It is a great satisfaction to report that Mrs. Price has generously established a fund at M.I.T. as a memorial to her husband, Raymond Beach Price, who was always held in the very highest esteem by his classmates and friends. The first contribution to the Raymond Beach Price Fund has already been made, and it is Mrs. Price's plan to add materially to it from time to time. Although no definite restrictions have been made, it is her wish that the fund be used, at least for a certain period after its completion, in aid of chemistry and related subjects, since it was through chemistry and chemical engineering that Price made the important developments and inventions in rubber regeneration and allied aspects of rubber chemistry that led to his high position in the industry, both in the United States and elsewhere. As may be remembered from an earlier account shortly after his lamented death, the latter part of his life, after his retirement from business, was devoted to an especially broad type of service to the country, based on his intensive knowledge of international matters through his worldwide travels, in which Mrs. Price was his constant companion.

Although very belated because of absence of information, it is with much regret that the Secretary reports the death of Vinton S. Paessler, who was with the Class as a special student from 1892 to 1894. Mr. Paessler was much older than his classmates, had already received an A.B. and an A.M. degree, and had had several years of business and teaching experience. After leaving Technology, he was for several years the principal of the Barlow School of Industrial Arts at Binghamton, N.Y., where he made his home throughout his whole professional life. After his years of teaching, he became a mechanical engineer in the firm of Shepley and Wells and later was a consulting civil and mechanical engineer. He died on June 15, 1944, but no record of his death was received at the Institute until late this last November. He will be remembered as a genial and friendly man.

Another of our special students in '94, Arthur C. Holt, died at his home, 20 Lombard Road, Arlington, on December 20. Holt was a graduate of Harvard, having received his A.B. in 1891, and spent the following year at M.I.T. For many years he was in the building and construction business, a part of the time as senior partner of the Holt-Fairchild Company in Boston. He retired before 1935 and had lived thereafter in Somerville and Arlington. As his alumni interests were doubtless largely with Harvard, he had never, since leaving M.I.T., taken part in our class affairs.

The Secretary still gets about a little, in connection with his active membership in the Institute of Food Technologists and as chairman of the board of governors of the Refrigeration Research Foundation. In the latter capacity, he hopes to make one more trip to the Pacific Coast within a few weeks, and en route to visit some research projects in Georgia, Louisiana, and Texas. More than incidentally, he hopes also to get in touch with some classmates, especially Harry Bates in Atlanta and, of course, with some of the "boys" in California, as he has previously done. An immediate pleasure is in store at the annual meeting of the foundation with its scientific advisory board and with other organizations interested in cold-storage warehousing, at Atlantic City from February 7 to February 9. He has been asked to introduce Dr. Compton, who is to be the guest speaker, at the joint meeting of these organizations on February 9—a real honor, and greatly appreciated.—SAMUEL C. PRESCOTT, Secretary, Room 3-233, M.I.T., Cambridge 39, Mass.

1895

The class notes in The Review furnish a medium by which all Alumni may know what is happening to the Alumni of all classes. For this reason, every man who has an interesting item to pass along should give it to his Class Secretary. We all like to read of current events, but remember the passing of a valued friend and classmate must also be recorded.

Your Secretary had a nice long, rambling letter from Billy Hall, V, who is now a qualified farmer living in Rochester, Mass. Bill likes to write about old times but desires, when possible, to stay "out of print."

Samuel Lawrence Bigelow passed away at his home in Hartford, Conn., on December 3. Professor Bigelow was registered with our Class during the period 1893-1895. He was graduated in Course V and followed the teaching profession in chemistry during his lifetime. Before he came to Technology, he had received an A.B. degree from Harvard in 1891. After leaving the Institute, he went to Germany and obtained the degree of Ph.D. from the University of Leipzig. Finally, he began his 39-year career on the Michigan faculty. He began as an instructor of general chemistry, became an assistant professor and acting director of the general chemistry laboratory of the University in 1901, junior professor of general and physical chemistry the next year, and professor of general and physical chemistry in 1907. He lived in Milton, Mass., for a number of years. In 1937, he retired from his Michigan work and was appointed a professor emeritus. He returned to Milton, Mass.,

for a few years and then to Hartford, Conn. Bigelow was a member of the American Electrochemists Society, the Michigan Academy of Science, the Franklin Institute of Philadelphia and Sigma Xi Fraternity. He published a number of technical books and contributed many articles to chemical papers.

Robert M. Cannon, III, passed away on January 22. We have had very little contact with Cannon for a number of years but knew that he lived for many years at 219 East Yampa Street, Colorado Springs, Colo. We learned of his death from one of the family.

William B. Stork, Lieutenant, U.S.N. (retired), has left Baltimore, Md., and may now be reached at Post-Office Box 437, Vineyard Haven, Mass. George A. Cutter has returned to Dedham, Mass., where his address is 215 Village Avenue. Hudson Cary is still living in Richmond, Va., but has moved to 3013 Sunset Avenue. Archer Estes Wheeler, III, has now retired and is living at 54 Morris Lane, Scarsdale, N.Y. Good for Archer. It's about time, and it might be in order to admonish him not to shovel too much snow at his ripe age. Best wishes for years to come. We regret to learn that J. Foster White, V, who is now located at the Hotel Wellesley, Wellesley 81, Mass., is permanently incapacitated.—LUTHER K. YODER, Secretary, 69 Pleasant Street, Ayer, Mass.

1896

The Secretary was well remembered with many Christmas greeting cards, and especially from the following classmates: Allen, Bakenhus, Coolidge, Eynon, Flood, P. B. Howard, Jacobs, Lythgoe, Litchfield, Melluish, Rutherford, Rockwell, Sager, Shaw, Smetters, Tilley, Tucker, Wayne, and Young. He also received a card from Armin Lindenlaub's brother Eric in New York City. The Secretary also had a very pleasant call from Lythgoe on January 8, when the latter was at M.I.T. attending a meeting of the American Chemical Society. Charlie Batchelder, who has been retired from business for many years and has occupied the same house in Melrose practically ever since graduation, has now changed to warmer climes by moving to 204 Lugo Road, Palm Springs, Calif.

Billy Anderson has written that the forest fires last fall in Maine which were near his summer home in Biddeford Pool fortunately did not reach his vicinity, because the approach to Biddeford Pool is from Fletcher's Neck, about a mile long and only an eighth of a mile wide, with the ocean on one side and the pool on the other. The wind was such that no sparks were carried to the Pool from the surrounding fires, and thus no damage was done. Billy has been retired as president of the Ferro Realty Company in Cincinnati for two years, but he does retain an office, which he visits about twice a week when he goes to town. He still looks out for the Transportation Building and several trusts. He was anticipating a visit in February to Massachusetts to his son Billy in Sherborn and his granddaughter, now nearly 16 months old.

Victor Shaw, who continues to reside on Star Route No. 2, Lake Hughes, Calif., writes that he continues in normal health,

alive and kicking (sometimes), despite the inescapable fact that he observed his 75th birthday on December 12. He hammers away on his typewriter about every day but has put out little fiction during the past few years, confining himself chiefly to scientific articles. He is wedded to his bachelor quarters in the California hills at an altitude of 3,100 feet, which he has named "Casa Los Alamos" from several tall Lombardy poplars around it. He has plenty of deer, upland quail, doves, pigeons, with some raccoons, bobcats, and woodland pussies. He escapes the Los Angeles dust and smog and the increasingly heavy city automobile traffic. He has not had even a common cold since he has been away far from the madding throng. He cannot get away entirely from mining, being an old Colorado boy. He made a prospecting trip into the Superstition Mountain region of Arizona in the fall of 1941, and again in February, 1942. Later, with a partner of many years, he spent three months during the winter of 1946-1947 in the same locality to complete the work begun in 1941-1942. He was not really prospecting, nor hunting the Lost Dutchman and Lost Peralta mines, for which that region is famous, because it is his belief that hunting the lost mines is a waste of time. On this three-months trip a thorough examination of local geological features was made, including careful panning of all washes and creeks of the entire drainage area, totaling about 25 square miles. Their findings were all entirely negative so far as gold is concerned, since all igneous formations are extrusive and relatively recent lava flows, both Tertiary and Quaternary. No evidence whatever exists of pre-Cambrian rocks, nor likewise of any metamorphic sedimentaries. There are no granites, no quartz nor calcite veins, nor any metallics excepting the usual ilmenite and magnetite, accessory to the basalts and the agglomerate rhyolitic tuffs there. All this was revealed by adequate sampling, and also by careful panning, which yielded not a single color of gold in the entire area. All the black sands, which were plentiful, yielded only the heavy black minerals mentioned above. As a result of their investigations, Victor wrote up articles later for both the *Earth Science Digest* and for Dr. Dake's *Mineralogist*, to which magazines he has been a regular contributor for many years. His article brought out plenty of comments, both pro and con. Some of the con type were from people in Phoenix, Ariz., who for many years had been making a good thing from tourists and many lost mine hunters. Shaw's papers indicated that there was no hope of finding any lost mines in the Superstition Mountains. The favorable letters were from other professional and scientific men who had previously investigated the district, and their findings corroborated that of Shaw. Anyway he said he sure had one grand outing, and found that despite his age he could still handle a 40-pound back-pack in rough country much as he did in Alaska 15 years previously. His daily schedule includes hiking one and a half miles up hill (1,000 feet), for his mail and exercise.—CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge 38, Mass.

1897

Your Secretary has been advised of the passing late in December in Wellesley, Mass., of Mrs. Hugh K. Moore, widow of our late classmate. Mrs. Moore will be remembered by many of us as the gracious hostess on the several occasions when we were entertained at the summer home of Mr. and Mrs. Moore at York Harbor, Maine.

William Henry Allen, XIII, died on December 31, at the Newton-Wellesley Hospital, aged 73 years. For 25 years he was the New England manager of the Phoenix Iron and Bridge Company of Phoenixville, Pa., and had his headquarters in Boston, Mass. He was secretary of the Massachusetts Foundation of Boston for 10 years. At the time of our 50th anniversary festivities, although his health was not of the best, he attended the graduation exercises of the Class of 1947 at Symphony Hall and sat with the '97 men on the platform. He also attended the Alumni Banquet at the Hotel Statler. Many of us who were there had not seen William for many years, and we greatly enjoyed his being with us. He leaves his widow and one sister.

Edwin R. Olin, X, has advised your Secretary that he retired from the Boston Elevated Railway Company on July 18, after 49 and one half years of service, a notable period of service. Ed states that he is now a gentleman of leisure and does not have to get up before sunrise on these cold winter mornings. That's something, too. And by the way, the Secretary wishes to apologize to any of the Class who were present at any of the functions of the 50th anniversary and whose names he failed to list as being present. He tried to record everyone, but omissions were bound to occur. Mr. and Mrs. Olin were present at the President's luncheon.

We understand that H. F. Sawtelle has retired from the transit department of the City of Boston and is associated with L. E. Moore '02 in consulting engineering work in Boston.—JOHN A. COLLINS, JR., Secretary, 20 Quincy Street, Lawrence, Mass.

1898

Eighty classmates have sent in "coming" cards for the golden anniversary! This from Lester as of January 25. Names to be added to the lists published in the November and January issues of *The Review* are as follows: George R. Anthony, John S. Bleeker, Arthur L. Goodrich, Fred L. Hayden, Robert Lacy, William A. Robinson, William F. Steffens, Atherton H. Tucker.

In addition, 26 classmates have sent in "Undecided but hope to come" cards, as follows: Burton A. Adams, Henry C. Belcher, David H. Blossom, George H. Breed, Winthrop F. Butler, Ira M. Chace, Jr., Frank F. Colcord, Everett N. Curtis, Irving B. Dodge, Albert J. Fearing, Edward T. Foulkes, Arthur I. Franklin, Frederick C. Gilbert, Charles H. Godbold, Arthur W. Huse, Charles le Moyne, Charles W. Pen Dell, Ralph R. Rumery, Eugene W. Rutherford, Homer E. Sargent, George L. Smith, Frank A. Spaulding, Dr. Alice W. Tallant, Horace R. Thayer, Albert W. Tucker, Robert M. Vining. Perhaps in this list are names of classmates whom you have not seen for years but would like very much to visit with at the 50th. A letter from you

may be just the final weight on the scales. Write to either Lester or the Secretary for the address or send a letter to be forwarded. The 50th promises to be both a comfortable and memorable occasion, and you will be doing a good deed in inducing another classmate to come.

There seems to be something very attractive about Guatemala to members of '98. George Cottle was there at the turn of the year and so was Dan Edgerly. From George we have a card showing the ruins of an immense cathedral, and he comments, "Walls six to twelve feet thick make no difference when Mother Nature goes on a rampage. This happened in 1773, and, frankly, the ruins are more interesting to me, I'm sure, than the original building would have been. It's still a fascinating country." Dan writes from Chicago: "It is not too late to send best wishes for 1948. I have only recently returned from a month in Guatemala. Thus Christmas among the palm trees was quite different from your very pretty, snowy New England card. Perhaps I should be in New England now, but this would entail buying a pair of "artics," memories of my boyhood days. It will not be long before we are together at the 50th." Too bad, George and Dan, that you two could not have run across each other in Guatemala and staged, under the waving palms there, a pregolden '98 reunion!

George and Dan were in Course V. Now from Course IV and from another part of the world comes, through the good offices and courtesy of Lester, a letter written to him by Gorham P. Stevens from Athens, Greece, in part as follows: "To the account of 'Who's Who in America' may be added the following: Last summer I decided to retire from the directorship of the American School of Classical Studies at Athens, Greece. (I was asked to continue, but the work in Greece at present is a bit too strenuous for someone in his 72d year.) I am now the honorary architect of the American School. In that capacity, I give lectures on ancient Greek architecture and archaeology to the members of the school. With no administrative work on my hands, I have time to undertake research. The enclosed reproduction of my last piece of work (a restoration of the interior of the so-called 'Theseum') will indicate what I mean. I suggest that you see whether the architects of the Class of '98 recognize this interior."

The reproduction mentioned as enclosed is a very unique and artistic Christmas and New Year's greeting card. We shall have it on exhibition at the golden anniversary for the architects to examine. Finally, Gorham sends a generous gift, 2,000,000,000 drachmas. Figure that out, you statisticians and mathematicians!

Now fly back to the United States and to the western part of the country, and you will find another author in the Class, Fred C. Gilbert, who has written a letter-travelogue to Lester from Tucson, Ariz. Thanks for the letter, Fred, which we are holding for the April notes.

We are very much pressed for time this month and accordingly other material on our desk will have to be published later. We will conclude the notes this month with one further brief comment.

In the delightful letter—"To the Ladies, God Bless 'em"—there was one omission. Lester omitted to tell the ladies to bring an apron. If there should be a cooks' strike next June, the ladies would have to turn to and do the cooking. There has just been a truck strike in Boston which has bothered some of us quite a bit. You never can tell what will happen. It is always wise to be prepared. So, ladies, bring an apron; bring two or more, so your husbands can help. There was a '98 man who could bake a very good cake. That was A. H. Jacoby, but then he was a chemist, and chemistry and cooking are very much akin. So we will draft the Course V men to do the cooking. The ladies can supervise. The Civils can triangulate the path from the tables to the ovens. The Mechanicals can devise hoisting apparatus to the ovens. The Sanitary Engineers and the Biologists can test for bacteria. Yes, there will be work for all. So come to the golden anniversary and pitch in and enjoy everything.—EDWARD S. CHAPIN, Secretary, 463 Commercial Street, Boston 13, Mass.

1899

George C. Glover, IV, now living in Melrose, Mass., was one of quite a number of Tech men, who, during undergraduate days, commuted on the same Boston and Maine trains. The particular coach chosen by the group always had a marked "technical" atmosphere. Under pressure he has disgorged the following facts: George was born in Auburn, Maine, with red hair and a red skin. He says he has spent most of his life risking his hair to save his skin. Since he early developed a fondness for pencil drawing and later for building construction, it was but natural for him to choose the Course in Architecture at M.I.T.

After graduation, George worked for a year for a firm of Boston architects; he then returned to the Institute for a post-graduate course. He was the first one to receive a grant from the Perkins Fund for a year and a half of study and travel abroad. After another year in Boston, George became a member of the firm of R. L. Bass and Company of Indianapolis, Ind., which was then engaged in planning municipal and state projects. He was one of a group of architects who organized the Indiana chapter of the American Institute of Architects.

In 1910, a second move was made back to Boston, where he became especially interested in resort hotel planning in the White Mountain region of New Hampshire, where he maintained a summer office. With the outbreak of World War II, George became plant architect for the Market Forge Company of Everett, Mass. He was put in charge of the plant expansion needed for work on numerous Army and Navy contracts. He is still with this firm and is continuing with his hotel planning.

Recently several members of the Class living in or near Boston met with the Secretary as a tentative committee to outline plans for our 50th reunion. Committees on entertainment, finance, hotels, and so forth will be needed. Send your ideas and suggestions to the Secretary.—BURT R. RICKARDS, Secretary, 381 State Street,

Albany, N.Y. ARTHUR H. BROWN, Assistant Secretary, 53 State Street, Boston 9, Mass.

1900

Ten letters written to members of the Class asking for material for items in these class notes have so far elicited only one reply. Charles Bacon writes from Santa Barbara, Calif., as follows: "There isn't much worth reporting. You can see by the enclosed record what sort of jobs I have worked at, the longest being with the Du Pont Company for 27 years. I am now retired and occupied only with what needs to be done in and around my home on the outskirts of Santa Barbara, where with my small family I moved two years ago. We consider this a permanent residence after living in many other places, mainly in the East. I don't go in for hobbies in the usual sense—that is, I don't build models of ships, chariots, covered wagons, and the like, but do piles of shopwork in many crafts. Because of these frequent migrations I am practically out of touch with my M.I.T. classmates. My age is 70; health, fair." The enclosed experience record referred to shows that, after leaving the Institute, Bacon had several short assignments and then 11 years with the Illinois Steel Company in Chicago before the 27 years with the Du Pont Company to which he alludes. He retired in 1943.

Joe Draper left on January 2 for Florida. His address there is 331 Cocoanut Row, Palm Beach. Arthur Walworth is also in Florida at Bradenton Beach. Your Secretary hopes to go south before the end of February. If any others of the Class are in Florida, please let him know where you may be found.

Fred Lawley is planning to spend some months on the West Coast this winter in and around Los Angeles, Santa Barbara, and Seattle. He has the addresses of several of the Class in these places and hopes to call on them.

The Taunton Gazette, in an obituary of Richard Wastcoat, whose death we reported last month, says: "He was born in East Taunton April 1, 1878, was graduated from Taunton high school in 1896 . . . and from M.I.T. in 1900. Four years after his graduation . . . he associated others with him and purchased the plant which became the Paragon Gear Co., and under this name it has since operated, making reverse gears and transmissions for marine engines. . . . He was three times married; his first wife and the mother of his children was Clara L. Prescott of Boston; second, Bernice Godfrey of Taunton, and his surviving wife, Bertha Cole of Taunton. His children are Virginia, wife of Peter Breymeyer; Caroline, wife of T. Brenton Bullock and Miss Richalie, at home. He served his city as a member of the Municipal Lighting Plant Commission. He was a director and past president of the old Taunton Chamber of Commerce, a member of various Masonic orders and of the Society of American Military Engineers. He was deeply interested in military affairs and was a captain in the Massachusetts State Guard. He was exceptional in his ability to organize and lead parades and successfully conducted many of Taunton's best. . . . He was a director of the Machinist National Bank, the Taunton

Co-operative Bank and a trustee of the Taunton Savings Bank."

The Boston Herald says of Herbert Howe: "Born in Mississippi, he came here as a child and attended Roxbury Latin and English high schools. He was graduated from M.I.T. and entered the bond investment business in Boston before his appointment to the [Massachusetts Income Tax] bureau." —ELBERT G. ALLEN, Secretary, 54 Bonad Road, West Newton 65, Mass.

1904

Cards have been received from Bill Eager, Frank Davis, and Jack Draper, but other members of the Class have done nothing to cut the deficit of the United States Postal Service.

Poor Jack Draper is trying to keep cool in the shade of a palm tree at West Palm Beach. Those of us who have been enjoying the invigorating New England atmosphere and keeping physically fit by shoveling snow, offer him our sympathy. Jack suggests we ought to have a reunion in June. If this strikes a responsive chord anywhere, please speak up promptly and make suggestions of time, place, and procedure. We need to know how you feel if we are to meet your desires.

Stan Skowronski made some calls in the Boston district a few weeks ago. He has been in the copper refining game since graduation and has become known as one of the best-informed men in the field. His fundamental research has established data which are considered standard in the industry. Dwight Fellows attended an evening meeting at M.I.T. to hear Charlie Locke '96, who was the speaker. Dwight is living with some other man in a Newton apartment.

Mrs. Stevens reports that Henry is holding the gains reported in the last edition of these notes.—Cy Ferris is dividing his attention between his Boston duties and his lumber interests in the West. Anyone with lumber to sell ought to have a lot of friends these days.—There are no deaths or retirements to report this time; hence with the absence of general communication, our notes do not occupy much space.—EUGENE H. RUSSELL, JR., 82 Devonshire Street, Boston 9, Mass. CARLE R. HAYWARD, Room 8-109, M.I.T., Cambridge 39, Mass.

1905

At several reunions the Secretary has been asked whether a 1905 "Technique" could be obtained. Search has failed to find any until recently H. B. Kane '24, Director of the Alumni Fund, announced the discovery of a few copies which may be obtained at \$4.00 a piece. If you wish one, write to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass., making out checks to Technique.

In response to a letter expressing the sympathy of the Class on the death of Dan Adams, we have this reply from Mrs. Adams: "For five years or so, Dan had been too sick to work with hypotension, the American businessman's curse. But he kept at it, in and out of the hospital, until the last three months. In June of this year (1947) we had a perfect three weeks, visiting our daughter Phoebe near Manchester. Her husband was in the Royal Navy for three

years and now is with Metro-Vicks, as electrical engineer. It seemed to be Dan's last bright spot, and he went downhill very fast after returning. Our Janet has lately bought a home in Wellesley Hills. She also married an Englishman, but he preferred living in this country and is now naturalized. They have two boys, 16 and 15, and a little girl of five. Phoebe in England has a very new baby girl." The letter ends with sympathy for the Secretary for the lack of co-operation in news gathering from "the boys, who are fast becoming old men." Perhaps that will spur you on to send in news occasionally before your widow has to do it. Dan, by the way, stopped occasionally to write of contacts made here and there.

We have but recently heard that Hub Kenway has had a serious battle with pneumonia, but today we can report that he is slowly but steadily on the way to recovery. Through Andy Fisher comes a letter from that retired globe-trotter, Prince Crowell, who, when he wrote, happened to be in Pasadena, Calif., after a trip through the Panama Canal. Prince had taken in the Rose Bowl game, climbed (on foot?) to the top of Mount Wilson, and was headed next for Laguna Beach for a month. He hasn't missed a thing; but this newshawk imagines that several times on his trip Prince has been within a stone's throw of several '05 men who would gladly have welcomed the Class Admiral. Which reminds me to remind you, when considering a trip of this kind, to give your Secretary your itinerary and let him send you a list of classmates whom you might see en route. You should have seen Prince's letter. He must have majored in English at Technology.

I expect to leave early in February to visit my daughter in Houston, Texas, and the only grandson. I hope to visit Willard Simpson in San Antonio and Bill Spalding in Fort Worth, and, if the schedule permits, to see Walter Whittemore at Little Rock, Ark., Bob Cutting in New Orleans, and Jim Barnes at Auburn, Ala. If you want news, you apparently have to go get it.

Recently, we had a bit of interesting news from Wesley Gilman. His son, Turner (M.I.T. '34), now located in Yokohama, attended a meeting of the M.I.T. Club of Japan, held at the home of Mr. Mikimoto, '38, of the famous cultural pearl farm family. There he ran into E. T. Barron and John Damon, who were on a mission from the United States Government to check over the Japanese point of view on reparations. Small world, says Turner.

In accordance with a vote of those assembled at the get-together at East Bay Lodge, Osterville, Mass., last June, I have an option on a reservation for Friday, Saturday, and Sunday, June 18, 19, and 20, 1948. Make your plans accordingly, Alumni Day is June 12. Plan now to attend both. Suggestions for our 45th reunion two years hence are in order.

Ralph K. Forsyth, XIII, died on November 11. He left the Institute before graduation and spent a year with the New York Shipbuilding and Dry Dock Company, which he left for reasons of health. After two years or so of traveling abroad, he retired to the family farm at Kingston, N.Y..

where, according to the last reports received, he had since spent his time in managing estates.—Earle F. Knowles, Course unknown, for whom the only address ever on our records was 55 Prince Street, Jamaica Plain, Mass., died at that address on November 18.—FRED W. GOLDFTHWAIT, Secretary, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, Assistant Secretary, 69 Newbury Street, Boston, Mass.

1906

The Secretary acknowledges Christmas cards from many classmates which added to the joy of the Christmas season. Included in the 1947 group was one from George Hobson with the following salutation: "Season's Greetings from the old 'maniac.' You must be thinking about retirement and where you will go to live. Better consider Maine, where you would have no state income taxes and a wonderful climate—unless you do not care for cold weather. In that case, you can go to Florida for the winter, with the other sissies."

"Sissy" or not, the Secretary is trying to assemble a few notes and then go out with a shovel and battle the elements. Those of us in and around Boston have certainly experienced a rough time this winter. The season is but one-third gone, and we have already had 42 inches of snow. At this writing, much of the snow has turned to slush as the result of a rainy day. More storms are predicted; thus it is now a case of continuing the battle before the next freeze sets in.

As for the "other sissies," several classmates are already in Florida, and there are more to go. Ralph Patch is in Winter Park; Henry Ginsberg, at Miami; Ray Philbrick is also in Winter Park; and Abe Sherman is at Sarasota. Frank Benham is starting very shortly for Miami.

In regard to retirement, classmates who are connected with the Bell System retire under its pension plan at the age of 65; therefore it is to be expected that the next year or two will include quite a few retirements. The Bell Laboratories Record for August carried a notice of the retirement of R. S. Hoyt, who was associated with our Class for a short time. The following extract from the Record indicates that Hoyt's career was along scientific lines and that he made many valuable contributions to the science of telephone transmission: "Mr. Hoyt graduated from the University of Wisconsin in 1905 with the degree of B.S. in Electrical Engineering. He then spent a year at . . . Technology as a graduate student and assistant instructor. In June, 1906, he joined the Engineering Department of the AT&T in Boston and there he became concerned with transmission development and research. In the 1907 move to New York, Mr. Hoyt came to the Engineering Department of the Western Electric Company at West Street. Two years later he continued his education at Princeton where he received his M.S. in 1910. Returning to Western Electric, he worked for a year on the development of various repeaters and on loaded lines, and then transferred to the AT&T where he was first with the Engineering Department and then with the D&R. When the latter was consolidated with the Laboratories in 1934, Mr. Hoyt

returned to West Street to what is now the Transmission Engineering Department. During his forty years of service, Mr. Hoyt has contributed materially to the theory of loaded and non-loaded transmission lines and associated apparatus, to the theory of cross-talk and other interference, to antenna theory, and to probability theory with particular regard to applications in telephone transmission engineering. As a consultant on basic theory he has contributed in the development of many transmission systems. Twenty-one patents have been issued to him and he is the author of several papers published in the Bell System Technical Journal."

The Secretary acknowledges the usual New Year's greetings from Fay, Spofford and Thorndike, of which engineering concern Carroll A. Farwell is one of the partners. Among the recent projects carried out by his concern is considerable work for the government in Alaska.—JAMES W. KIDDER, Secretary, 50 Oliver Street, Boston 7, Mass. EDWARD B. ROWE, Assistant Secretary, 11 Cushing Road, Wellesley Hills 82, Mass.

1907

Largely as a result of the directories of our Class that I mailed to all men on my mailing list last December, I have a few corrections and a few additions to pass on to you. Leverett Cutten is plant engineer rather than plant manager of the Mack Manufacturing Corporation in Allentown, Pa. He writes that he was supposed to have been retired two years ago but instead he "was recapped and is still running strong. The tread seems to be all good, but it may be that the side walls of the old carcass are a little weak."—From a letter dated January 7 from John F. Johnston of 1460 Euclid Avenue, Berkeley, Calif., I quote as follows: "I came to California the day after I was graduated in June, 1907, and all my life has been centered here in the Bay region. I followed structural and mechanical engineering for about 10 years. For a second 10 years, I was with a major oil company as lubrication engineer, industrial relations man, and merchandizing manager.

Then I went into shipbuilding, in the industrial and labor relations end, and stayed with it as long as there were any ships to be built in this area. Finally, in 1936, I became a civil service employee, first with the Soil Conservation service, then with the Maritime Commission, and now with the Navy Department. My position since May, 1946, has been that of superintendent of training at the San Francisco Naval Ship Yard. . . . My health is excellent in every way. My wife (still the original, I am happy to say) is living and well. I have four married daughters who have given me six grandsons and two granddaughters. . . . I hope to retire in two years. . . . I occasionally attend the San Francisco Technology Club, but my working place is so situated that it is very inconvenient to get there. I was back in Boston about 10 years ago but on a rush schedule so could not look up my old haunts. I have always been very proud of my Technology training, and my graduation from M.I.T. has always been an acceptable voucher for my education. . . ."

Harold Kingsbury wrote on December 29 that he retired last September 1, after 28

years as patent lawyer with the Du Pont people in Wilmington, Del. His residence address is 16 Bedford Court, Wilmington.

—The home address of Edward G. Lee is now Box 67, Biddeford Pool, Maine. Ed is still with the New England Power Company, with office at 441 Stuart Street, Boston, and is usually there from Monday mornings until Friday noons, spending his week ends in Maine.—Bill Lucey is now executive vice-president of Rayonier, Inc., with offices at 122 East 42nd Street, New York 17, N.Y.—A formal news release by the Du Pont Company on last December 18 announced the retirement of Frank MacGregor at that date after a successful career of 31 years with that concern. He joined the development department there in 1916 and became assistant director in 1921. During that period, his department was intimately concerned with the company's expansion from the manufacture of explosives alone to the production of diversified chemical products. In 1922, Frank was made control manager of what was then the paint department. Later, he returned to the development department and was also managing director of the Hotel du Pont Company from 1926 to 1928. From 1928 to 1934 he was general manager of the acel department of the Du Pont Rayon Company. He then went to South America as president and general manager of Ducilo S.A. Productora de Rayon, Du Pont affiliate in Buenos Aires. Returning to this country in 1939, he was on special assignment until June, 1941, when he was appointed director of the Company's priorities division. In February, 1942, he became assistant general manager of the electrochemicals department and in 1944 was made general manager. Frank's home is at 2307 Ridgeway Road, Wilmington, Del.—Frederic Menner is at 211 Alston Road, Santa Barbara, Calif.—A note received in January from Mrs. John S. Nicholl states that John is confined to the house, is not able to write, do anything, or go anywhere. His residence is at 15 Leighton Road, Wellesley, Mass., not No. 65 as stated in the recent class directory.

Seldon E. Rockwell wrote on December 30 that his address is Post-Office Box 48, Capitola, Calif. He was a civil engineer with the United States Bureau of Reclamation until December, 1945. Since then he has been retired, doing only an occasional consulting job.—Theodore L. Smith says that he is a mechanical engineer with the Gillette Safety Razor Company, not a research engineer as stated in the class directory. His home is at 61 Main Street, Concord, Mass.—The address of Herbert A. Sullwold is now 1501 Via Monte Mar, Palos Verdes Estates, Calif. I suppose he is engaged in architectural work, but I have not heard from him for many years.

Henry C. McRae, who was affiliated with our Class in Course XI, died on December 21, according to word received from the Alumni Office. He worked as an engineer with the Baltimore Sewerage Commission until 1915, was a first lieutenant of engineers during World War I, and took up poultry raising in Florida. I have not heard from him since 1937. His most recent address of record was, in 1922, Seventh Avenue, Tampa, Fla., although his name

was not in the 1947 Tampa telephone directory.

Under date of December 29, Willis Waldo, who is vice-president and chief engineer of the Florida Ramie Products, Post-Office Box 1685, West Palm Beach, Fla., wrote me a most interesting letter telling of some of his experiences, and of his contact a few years ago with one of the Whitin family here in Whitinsville, Mass., where I live. He enclosed some samples of fabrics made partly of ramie, and also a very lovely doily made of hand-decorticated (extracted from the stalk) ramie from the Philippines. He sent me, too, a copy of the November 15, issue of *The Chemurgic Digest*, published by the National Farm Chemurgic Council, which contains a long, illustrated article by himself on "Ramie Products in the Florida Everglades." These things I am adding to the ever increasing exhibit pertaining to our classmates that makes a real center of interest at our class reunions. I quote briefly from Willis's letter: "When I was an engineering consultant for the War Production Board in 1943-1944, I made a general investigation of the subject of ramie in the United States and in the West Indies. . . . Here was a material of remarkable properties that had never formed the basis of an industry in the United States because of the technical difficulties involved. It looked like an interesting prospect, and perhaps the difficulties might not be too great. So when I had the opportunity I joined a group who were organizing a company to process ramie. . . . The September hurricane drowned out most of our supply of raw material in Florida. . . . We believe that the availability of well-combed ramie silver stapled to about six inches may be found very useful by the worsted industry in New England. Our present output is in the form of undegummed ribbon, which is in very active demand. . . ."

Would any of you men like to secure a copy of the 1907 "Technique," published while we were undergraduates? I have learned that some of these are available at \$4.00 a copy. Write directly to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass., and make your checks payable to Technique. — BRYANT NICHOLS, Secretary, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

The second dinner meeting of the 1947-1948 season was held in the Grill Club Room at Thompson's Spa, Washington Street, Boston, on January 13. The following were present: Stiles Kedy, Bill McAuliffe, Jeffs Beede, Joe Wattles, George Belcher, Leslie Ellis, Linc Mayo, Fred Cole, Sam Hatch, Frank Towle, Myron Davis, Harold Gurney, and Nick Carter. Our 40th reunion, which will be held next June, was discussed, and we hope to be able to hold it at the Oyster Harbor Club, where we held our 25th, 30th, and 35th. We are still waiting to hear from the club, however. Joe Wattles and Harold Gurney teamed up in showing some fine Kodachromes.

We are sorry to report the death on January 12 of Leo Stone, who for many years was an engineer with the transit depart-

ment of the City of Boston.

G. Temple Bridgeman, consulting engineer of San Francisco, is a member of the special seven-member committee for exploration and mining established to advise and guide the head of the division of raw materials, a special department of the Atomic Energy Commission. — Bill Given, Jr., is at the head of a national committee for the development of the financial resources of Yale University.

We only recently learned that Mat Porosky was awarded last February a certificate of commendation by the Navy Department Bureau of Ships. Vice-Admiral Mills in his letter to Mat stated: "This award is made for your outstanding administrative ability, excellent co-operation, and great personal effort as general manager of the Eagle Signal Corporation in producing highly specialized electromechanical naval communications equipment for vital use of the United States and its Allies." — H. LESTON CARTER, 60 Batterymarch, Boston 10, Mass.

1909

Testimony of the widespread influence of Hugh Lofting and his "Dr. Dolittle" comes from Paul himself: "Class notes in the January Review report the passing of Hugh Lofting, and I want to pay this personal tribute to his memory. I wish I had known Hugh for he has meant a great deal to me, as I'd like to tell you. You see I came out to Glen Ridge, here in Essex County in Jersey, to make my home with the Farrars in 1924. There were in the home a son, Robert, and a daughter, Virginia. Across the street lived the Baltzleys, and there were two daughters there: Elfie and Lois. I got on famously with these four fine youngsters from the very first day I met them. It is, in fact, not too much to say that they have been part of my life for these 20-odd years. Somehow we began to have reading sessions on Friday evenings, since there were no lessons to prepare for the next day. And of all the books we read together, none ever made quite the hit that Hugh's Dolittle books made. These young folks have families of their own now; but what good times we used to have at the Friday evening sessions! We even formed a club that we called the Roviellows, a name made up from the first syllables of the children's names: Ro from Robert, Vi from Virginia, El from Elfie, Lo from Lois, and the W came from my family name. Every spring I took the Roviellows to a matinee in New York, and I wish we might have taken Hugh along with us on one of our expeditions. I am sure he would have had a good time, and I do know the young folks would have had a grand time with him! We Roviellows have lost a dear friend!"

That the end of the war did not end Molly's usefulness in our international problems is evidenced by the brief note which he sent to Paul on January 6: "As a last item of class news before my departure tonight for an absence of several weeks, I want to let you know that I am leaving for Athens, Greece, to serve as consulting engineer for the American Mission there on certain power and hydroelectric problems. I shall be back in February and hope to tell you all about it then."

Charlie Locke has notified us that this is the year when classes with numerals ending in 4 and 9 should name candidates for class representatives on the Alumni Council. Our representative in the past has been Art Shaw, I, and we know that we have the 100-per-cent approval of the Class in naming him as a candidate to succeed himself. Art has rendered high service to both the Class and the Institute, and we are fortunate that he is willing to continue as our representative.

Back in our Institute days, a triumvirate consisting of George Gray, Reg Jones, and Chet Dawes (all VI) could usually be found collaborating in those long Electrical Engineering lab experiments as well as in other activities inside and outside the classrooms. This week, after something like 39 years, fate brought all three of us together again, all engaged in the same activity in the American Institute of Electrical Engineers. As we already have reported, Reg is chairman of the standards committee, which has charge of all electrical standards which come under the jurisdiction of the American Institute of Electrical Engineers and related societies. Undoubtedly through the good offices of Reg, your Review Secretary has been made a member of that committee, and now George is chairman of a subcommittee to co-ordinate communication standards.

At the usual time of meeting, there was no space available at A.I.E.E. headquarters; hence we all met in Reg's office in the Bell Laboratories at 463 West Street, New York. Imagine an office large enough to contain enough of those long board-meeting tables to take care of something like 30 members, besides a regular desk for the stenographer. You will also recall that in the April, 1947, number of *The Review* Paul described a conference that he and Harry Whitaker, VI, had in Reg's office, when out of almost nowhere a nice-looking young lady in uniform appeared with a most delicious luncheon. Well, multiply this by 10. When our meeting was over, we just strolled around the corner of the corridor and into another large room, and there was a most delicious luncheon awaiting us A.I.E.E. members. The Waldorf-Astoria could not have improved on the quality or on the service. And that was not all. Your Review Secretary had another engagement across town and asked Reg's most efficient secretary if she would just notify the party that C.L.D. was on the way. She not only did this but told him that when he reached the entrance there would be a car to take him there. Sure enough, there was a limousine and chauffeur!

We have already remarked how the constructive activities of Tom Desmond, I, are a great help to us secretaries in keeping us supplied with copy for the notes. We note in the *Herald Tribune* that Tom is presenting a bill to the New York state legislature to set up an advisory council "to bring the state closer to scientific developments and adapt state administrative machinery to the new atomic era." The bill would authorize the governor, acting with the consent of the senate, to appoint 19 members to the council to include persons of "outstanding qualifications and attainment" from the fields of scientific research. The council

would study scientific developments, collect and analyze lists of scientific projects, and assist in developing a long-range scientific research program under public and private auspices. Also, during the winter, more than a thousand Boy Scout leaders, attending the annual meeting of Region Two (New York and New Jersey) of the Boy Scouts of America, at the Hotel Astor, in New York City, witnessed the presentation of the Silver Antelope Award to Thomas C. Desmond of Newburgh, state senator. This is the highest award that can be given to any Boy Scout leader in the New York-New Jersey region. It was presented to Senator Desmond because of his services for a number of years as a member of the regional executive committee and particularly as chairman of the recent 25th silver anniversary celebration.

We again regretfully report the passing of another classmate, Aubrey Hamilton Straus, VII (special), on November 6 in Richmond, Va., at the age of 60 after a long illness. He was a member of an old Richmond family and for a long time widely known as a bacteriologist and leader in civic activities. He was formerly director of laboratories for the Virginia Health Department and city bacteriologist. He was graduated from Richmond College in 1907 and won an M.A. at William and Mary College before coming to the Institute, where he took graduate courses. He also studied public health at the University of Michigan and at Johns Hopkins University.

Straus served in World War I with the rank of lieutenant in the United States Army Sanitary Corps. He was active in civic affairs as director of the Richmond Public Forum, worker for the Community Fund and board member of the Children's Home Society. In 1911 he married Wilma Marx, who survives. Besides his wife, he is survived by his mother, Mrs. Ella K. Straus; four children, Clifford A. Straus and Adah V. Straus, both of New York; Mrs. Robert C. Goodman of Norfolk, and Mrs. Reinhart W. Koch of Joliet, Ill., and by two grandchildren. — PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 285 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1910

Too late for mention in the February issue of *The Review*, I receive the sad news of the death of W. Dexter Everett on November 19, at his home in Belmont, Mass. A native of Dorchester, Mass., Mr. Everett was 59 years old. He was a graduate of the Mechanic Arts High School, and Technology with our Class, receiving his degree in Chemistry. Shortly after graduation he went West, and was active in mining operations in Utah and Nevada. Mr. Everett joined the staff of the Hood Rubber Company in 1917, working successively in the work methods, time study and productions department of the laboratory and was a manufacturing department superintendent. For the two years since the war, he had been engaged in style and design work, and, also,

served as contact man with outside plants handling the manufacturing of parts for the Hood Company.

Bertholf M. Pettit has been appointed acting director to the new construction division of the Comptroller's Office for the State of Connecticut. He was a former assistant administrator of the P.W.A. housing division in Washington. — I recently received a notice of the change of address of George McRae from Short Hills, N.J., to Belmont, Mass. I knew that he was the vice-president and general manager of the New Jersey Bell Telephone Company, so I telephoned him and find that he has retired to Belmont to be near his son.

A Christmas card came from Walter Spalding, who is doing consulting work at 77 Merchant Street, Honolulu, T.H., and he was just starting on a three-days trip to Los Angeles. I had the pleasure of talking to Abbott Allen recently. He is with Stone and Webster and is very busy. Harold Akerly of Rochester, N.Y., stopped in to see me during the Christmas holidays, and we had a most enjoyable luncheon together. He was visiting his daughter, who lives in Waban, Mass. — HERBERT S. CLEVERDON, Secretary, 120 Tremont Street, Boston 8, Mass.

1911

"In the armed forces, we cannot afford to live on the reputations we made from December 7, 1941, to August 14, 1945," our four-star general, George Kenney, I, says in the January issue of *Ordnance Magazine*. "We must think in terms of modern war; World War II is not modern — it is out of date." Airplanes which approach the speed of sound "have brought a host of troubles," according to George, and with the advent of the turbine and more recently the jet, metals used a year or two ago are useless in the heats encountered in the jet power plant, and simple riveting jobs won't do in the modern fighter or bomber, whose surfaces have to be smooth as glass. "We can gain 15 miles an hour on a jet fighter by a smooth paint job, but when the continual flexing of the wings puts a few cracks in the paint, we lose 25 miles an hour," he says. "So far we haven't been able to develop a paint that doesn't crack, and further, instruments which worked satisfactorily at 400 and 500 miles an hour are too crude for modern speed.

"In the armament field we must start all over again. Our bombs are obsolete for new high-speed aircraft. They would simply tumble all over the sky, shedding fins and possibly detonating themselves in the violence of their own gyrations if dropped at a speed of 600 miles an hour. New bombs must have surfaces as smooth as the aircraft which carries them and inside the bomb casing, in addition to the explosive charge, will be all kinds of electronic devices to guide the bomb to its target." George considers aircraft machine guns and cannon used in World War II "only slightly better than the cannon used by the English at the Battle of Crécy 500 years ago" and already machine-gun bullets are being fired at intervals of one-twentieth of a second apart, trailing the other by 170 feet. But, in one-twentieth of a second, a 600-mile-an-hour fighter moves 44 feet. "If we want to be

sure of hitting airplanes in air combat we must get those bullets closer," George concludes. "That means a higher rate of fire and multiple gun installations. For higher rate of fire, tougher metals that can withstand terrific heats must be developed. The time for planning is not next year, next month, or even tomorrow. It is right now!"

Just before mid-January, during my annual Manhattan pilgrimage for the Retail Dry Goods Show, I spent the evening and night with Don and Lois Stevens in suburban Ridgewood, and Don brought me more up to date on his interesting discussions with President Compton on Federal support of education. As a result of Dr. Compton's statement that what I was trying to do "was not to argue for Federal support of education but rather to argue for private support of education," Don wrote back, "This is enough to make me feel that I should do my part in accordance with my assertion that I would rather give more than less if we are to continue on a private support basis" and forthwith sent an additional subscription to the Alumni Fund, which tripled his original contribution for 1947-1948.

Continuing, Don wrote to President Compton: "In the original conception of M.I.T., the conception under which I received my degree, I most decidedly oppose Federal support for higher education. It is not necessary that our consciences should be adjusted to the idea of accommodating all the people in the world that want college educations. It is all right if the existing colleges cannot accommodate everybody. As a matter of fact, almost everybody would rather go to college than work if they could get their college education free. If the educators would take the lead in the return to sanity and proper control of the national resources and the national debt, they would do a much greater service than by trying to 'educate' everybody. Higher education does not prevent war or crime."

"You say: 'Whether the economy of the country can support this trend (Federal support of higher education), or rather, how much longer and farther it can support this trend, is quite another question and a serious one.' Please don't bury this thought. Please bring it right out in front and let it be your guide. We need you to lead our thinking properly. M.I.T. and Chicago got rid of the idea that they had to play football. You can lead us on the platform in the idea that it is better to have the best reputation than to have the most students at Federal expense."

"I still agree with George Washington," concludes Don. "All we need is harmony, honesty, industry, and frugality to make us a great and happy people." Remember, Don is anxious to hear from classmates as to how they stand on this important question of the day. His home address is 141 Woodland Avenue, Ridgewood, N.J.

At the turn of the year, with three months to go on Alumni Fund VIII, we had exceeded our 121-subscriber quota by 11 per cent with 134 men contributing \$5,327 or 190 per cent of our \$2,800 quota. Currently, we have 360 good addresses in the 1911 files, which means that three out of eight are subscribing. There are three sections of the nation, however, where close

to half of our members are subscribing: Metropolitan New York and the Middle West, each with 46½ per cent subscribers, and Metropolitan Boston with 45½ per cent. The geographical breakdown will interest you: Greater Boston, 41 of 90; balance of New England, 16 of 61; Greater New York, 25 of 54; balance of East Coast, 21 of 64; mid-West, 18 of 39; Southwest and West, 6 of 31; territories and foreign, 5 of 15.

Since before the war we hadn't heard a word from Clarence Ofenstein, I, formerly a consulting engineer with offices in the nation's capital. Recently, as a result of a tryout card, we learned that he has been ill since February, 1942, and has only lately been released from a West Coast hospital. His current address is in care of Mrs. Emilie H. G. Ofenstein, 3183 B Street, San Diego 2, Calif.

I agree with you — these notes are quite a bit shorter than usual; but wait a minute — is that the fault of Obeegee? A thousand times, No! It's your fault — you didn't "write to Dennie." Better do that as part of your spring cleaning! — ORVILLE B. DENISON, Secretary, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford 55, Mass.

1912

On November 22, the Boston Herald carried a most interesting story about Dr. Dolphe Martin by Rudolph Elie, Jr.: "He looked familiar and he sounded familiar but I couldn't place Dolphe Martin to save my life, so I kept prodding around with impudent questions and finally he smiled broadly. 'What you're trying to get at,' he said, displaying his widest grin, 'is who am I? Well, maybe you'd remember me best as Dok Eisenberg.' Then the bells rang, and I recalled that long-gone day of crystal radio sets made out of wire around a Quaker Oats box, of green concert receivers laboriously constructed from designs printed in the daily papers, and of anguished cries from skeptical elders as they tripped over tangled masses of spaghetti wire, rheostats, and earphones . . . the days, in short, of radio's foaling. For then it was, out of Shepard's Colonial Restaurant, that Dok Eisenberg and his orchestra first established the pattern of radio music that has since changed only in sophistication. In 1921, Dok's Hooper rating, had anyone thought of such a thing in those days, must have been a clean 100 per cent, and from then until he dropped out of sight in 1935, his name was hardly ever off the Boston or New York network air. 'But radio was an accident for me,' the short, rather heavy-set musician said, his accent strangely British in flavor. 'I've had a pretty cockeyed career, you know.'

"He was born in Poland just about 50 years ago, I'd guess. His parents brought him to Boston when he was three years old and they settled on Lynde street in the West End. His father wanted him to be an engineer. 'But I always had a leaning to philosophy,' he said, 'and the upshot was that I graduated from M.I.T. as — of all things — a biologist.' Then he went to Harvard for his master's degree in psychopathology, and this led him to a medical

degree from Harvard, too. All this time — the pre-20's — he had earned his way playing the violin in a Columbus avenue café. Upon his return from a tour of France and Spain in 1920, a friend asked him to play in Shepard's just for a day or two. 'That's when my career shot off on a tangent,' he smiled. For he found the new radio business pyramiding to success. 'They doubled my salary every week or two,' he explained. 'And how could a poor Polish boy resist that? Even if he did have a doctor's degree?' There followed the hectic years in radio and the entertainment business and, in 1935, Dok washed out of the whole thing and went to France, disillusioned and unsatisfied with the turn of his career. In France, as Dolphe Martin, he began a new life as a conductor and composer, but this time it was classical music — his first love. 'The obverse side of the medal,' he sighed. And he had risen to the post of conductor of the Cesar Franck Symphony orchestra (on the left bank, I gathered) when the war began. He got out a jump ahead of the Nazis and came back to Boston. This time, however, younger men had moved into radio music, and Dolphe began another new career producing 'Youth on Parade' and other radio shows. Today he's seeking and grooming new radio talent, popular singers mostly, in a sort of a finishing school. 'You know,' he said, in his quiet, amiable way, 'the atmosphere of success is so rarefied I felt it offered a great field for serious study. Most young people, trying to get a break in radio, the theater, music or any field of creative endeavor, just don't know what they're up against and so they don't survive, not because they haven't got talent, but because they can't take bad breaks.' He rates talent as a mere 10-per-cent qualification. 'General intelligence, drive, ability to survive heartbreaking disappointments, character, quickness of mind, persistence above all; these things are more important than talent. Every day really talented people hear that those they know to be less talented have been or are enormously successful and they say "Why? How is this possible?" It's possible because the less talented one has had the ability to survive. Luck, too, plays an extremely important role in success, says Mr. Martin. 'But you've got to keep going until something lucky happens. Luck favors the persistent. In the meantime, you have to be able to take cold, harsh analysis, the unbiased criticism of others. And you have to be ready to realize the awful truth that maybe after all you really haven't got it — and not let it hurt you or embitter you. Who was it said that the only thing worse than having no money is having too much? Oscar Wilde? Yes. Well, maybe he could have said the same of success.'"

Paul M. Tyler, III, who terminated his work in Technology at the end of August to undertake general consulting practice, has been engaged to conduct a survey of minerals in New Jersey, according to the following item from the Newark News: "A geological survey is being conducted by the Rutgers University Bureau of Minerals Research in co-operation with the State Department of Economic Development to discover why New Jersey farms and indus-

tries are importing needed mineral raw materials from outside the state although they exist in sizable quantities within its borders. Dr. Helgi Johnson, director of the bureau and Rutgers professor of geology, announced the survey. . . . Dr. Johnson said the bureau has started work to determine the mineral raw materials consumed by New Jersey industries and farms and the supplies of these materials economically available in New Jersey. He also announced that Paul M. Tyler, mineral technologist and economist who has been recently associated with the Atomic Energy Commission, has been engaged to conduct the survey. Dr. Johnson said: 'We are going first to survey the mineral needs of industry in co-operation with the Rutgers Bureau of Business and Economic Research and then are going out in the field to point out deposits which these industries can use. While in the past it may not even have been economical to develop these native mineral resources, new technological developments and freight costs have changed the picture.' Bureau geologists last year discovered an easily accessible deposit of 700,000 tons of lime marl suitable for agricultural purposes near Vincentown in South Jersey. Since then they have found this deposit formed by the remains of prehistoric sea animals now comprises more than 2,000,000 tons. 'The lime marl we have found in South Jersey constitutes a source of agricultural lime that could supply New Jersey farmers for many years to come,' Dr. Johnson pointed out, 'but it is only one of the mineral raw materials which we are certain are available in the state to meet the needs of industry and agriculture. The locating of these deposits and the determination of the most economical ways to put them within the reach of their users will create new industries and new employment. A preliminary report by Mr. Tyler indicates favorable chances for building new plants for expanding current production in lime, apatite, feldspar, sands and even iron ore.' As a consultant, Tyler assisted in organizing the Bureau of Mineral Research early in 1945. A graduate of . . . Technology, he became eastern regional engineer for the U. S. Bureau of Mines before the war. He served as a consultant to the War Production Board and as a member of the Foreign Economic Administration during the war."

Many newspapers and trade papers carried accounts of the election of our Class Secretary, Frederick J. Shepard, Jr., to the presidency of the Electrical Industrial Truck Association at the annual meeting in the McAlpin Hotel on December 4. Mr. Shepard is treasurer of Lewis-Shepard Products, Inc., Watertown, Mass., engineers and manufacturers for more than 33 years of a wide and varied line of wheeled materials handling equipment including electric power fork trucks, lift trucks, and portable elevators. The Electrical Industrial Truck Association with headquarters in New York, comprises approximately 80 per cent of the manufacturers of electric industrial trucks in the United States — about 16 different manufacturers, including those who produce batteries and chargers for the equipment. "Materials handling," Mr. Shepard stated, "constitutes a most important phase of manufacturing. More than 20 per cent of the

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total cost of manufactured products is represented by material handling costs. During World War II, our armed forces evolved many new processes of handling vast quantities of materials. Notable among them is their development of the unit load and pallet system of materials handling, which resulted in a great saving in man power necessary for other vital jobs. This unit load and pallet handling system necessitated the further development of power fork trucks. Today, one man with a fork truck can, without exertion, pile two-ton loads to a height of 12 feet in a warehouse or other storage area. The purpose of the Electrical Industrial Truck Association," Mr. Shepard said, "is the dissemination throughout industry of information on battery-powered materials handling equipment through co-operative advertising, and to act as a source of information to industry on matters relating to materials handling." Mr. Shepard is the retiring chairman of the materials handling division of the American Society of Mechanical Engineers.

H. B. Kane '24, Director of the Alumni Fund, announces that there are a limited number of back copies of "Technique" available at \$4.00 a copy. Issues of possible interest to members of our class are 1908, 1909, 1910, and 1913. Write directly to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass., is interested.

Bernard Morash, VI, gives an excellent reason why you should tell us about yourself for the class notes: "I have just had a note from Shep attaching a letter from a chap by the name of Ed Hurst, who was in the Class of 1913 and was an old buddy of mine in the Cosmopolitan Club. He came from New Zealand, and I was a Canadian. We have been out of touch with one another since our school days at the Institute, and he happened to read these Class of 1912 notes and saw my name there and wondered whether it were the same Billy Morash he used to know at the Institute and with whom he had hoisted a good many steins of beer. Well, that may or may not be a good reputation, but I can see how the class notes serve an excellent purpose in bringing old friends together." How about sending in some news now? — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown 72, Mass. LESTER M. WHITE, Assistant Secretary, 4520 Lewiston Road, Niagara Falls, N.Y.

1914

Somewhat belatedly, but none the less regretfully, we have received word of the death by cerebral hemorrhage on July 5 at Oakland, Calif., of Leslie Standish Hall. About 10 years ago, Hall suffered from a heart ailment, but he had largely recovered and had been very active in his professional work during recent years. Death came almost immediately when he was suddenly stricken in what appeared to be excellent health. Hall was born in Corning, N.Y., and was active at the Institute in track, winning the varsity letter. He was graduated from Course I, taking the hydraulics option. After graduation, he was employed in the Office of Public Roads of the Department of Agriculture at Washington, was transferred to Cincinnati, and later went to California to undertake hydraulic studies.

For the past 23 years, Hall had been a hydraulic engineer for the East Bay Municipal Utility District at Oakland, finally becoming principal hydraulic engineer. The local press described many large projects which were constructed under his direction, including long-range planning studies for the water and sewerage development of the district. Hall was active in many local societies and civic organizations and was the author of numerous papers in his professional field. As recently as 1946, he received the Hilgard prize of the American Society of Civil Engineers for his paper dealing with flowing water. On October 30, 1923, he married Geraldine Bohannon, whom he met at the University of California. She now holds the degree of doctor of jurisprudence. They have a 20-year-old son and two daughters, the eldest of whom was married only a week before Hall's death.

Jim Reber of Auburn, N.Y., together with Mrs. Reber and their two children, took a two months' motor trip to the West Coast last summer. The trek west was first to San Diego, then up the entire coast to Canada, with stops at Banff and Lake Louise. Jim reports that the trip was taken in a most leisurely manner with stops for golf, fishing, and mountain climbing. Jim's trip around the country sounds very interesting and rather competes with those of Frank Ahern. Frank, it will be recalled, has to visit the national parks for the Department of the Interior to see that safety standards are being maintained. Incidentally, Frank has a son at M.I.T. who is a sophomore in Architecture. His oldest boy, who was graduated from Cornell under the Navy training plan, is with the Federal Bureau of Investigation at Savannah.

Bert Hadley writes that the reason he had to miss Charlie Fiske's New York party was that he is chairman of the small arms ammunition committee of the Army Ordnance Association, and that on the evening of the dinner the committee was meeting at Hartford. Your Secretary understands that as chairman of the board of trustees of Middlebury College, Bert is doing a fine piece of work in readjusting that college to some rather strenuous postwar conditions.

Mark Boyd, who took special work in the Public Health Course, has been appointed to the state board of health of Florida. Dr. Boyd has recently retired as head of the Rockefeller Foundation's malaria research project at Florida State University, where he trained more than 200 malarialogists during the war. — HAROLD B. RICHMOND, Secretary, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, Assistant Secretary, 1775 Broadway, New York 19, N.Y.

1915

Pay your class dues! Thank you!

Frank Scully is back from three weeks in London, Belgium, and Paris, where he had a pleasant visit with Ken Boynton, including lunch at Ken's house with their overcoats on. Frank will give us his memoirs of the trip for our notes. I had a card from him after an evening at the Paladium in London.

Jim Tobey enjoyed the New York class dinner in December: "I thought we had a very pleasant affair in New York when the valiant sons of 1915 gathered. It was a

joy to see them all. If you come down again, be sure to telephone me. . . . I am just finishing a book on diet, under contract, and have several more to do, so shall be kept pretty busy. . . ."

Our thanks to the many classmates who remembered Frances and me so thoughtfully with Christmas cards. The personal messages warmed us with a friendly feeling. I shall save for the class archives Tower Piza's card — a picture of him wearing a snug-fitting beret, rocking astride a camouflaged, wooden hobby horse on what looks like the top deck of a ship. Let it go at that. Because of strict censorship, I must refrain from any further comments.

The New York Mirror on November 13 had a picture and long story about Bridge Casselman, "an astute chemical engineer, who has spent the past 15 years discovering the best way to shave for men — and women." With Louis Young and Gillette's famous "Look Sharp, Feel Sharp, Be sharp," we've a couple of pretty smooth classmates.

Gene Place has prepared a program for raising the capital gift for our 1965 fiftieth reunion presentation to the Institute and will have a report for you next month. Remember those famous words, "It is more blessed to give . . ." Pay your class dues! — AZEL W. MACK, Secretary, 40 St. Paul Street, Brookline 46, Mass.

1916

Gordon M. Fair writes from Harvard University: "I know that I have been a somewhat somnolent member of the Class of 1916, and I feel that there really isn't much of interest in my adventures. While I am currently serving as dean of the faculty of engineering of the graduate school of engineering of Harvard University, my main responsibilities are still as a professor of sanitary engineering, and it is in connection with my professional interests in this field that I continue to serve in an advisory capacity to a number of government agencies. If the Class of 1916 ever has a gathering less formidable than the long week ends on the Cape that have characterized its past, I should enjoy renewing old acquaintances."

Jap Carr has contributed, through the Class of 1916, 400 shares of Carr-Consolidated Biscuit Company stock to the Massachusetts Institute of Technology. This generous gift is greatly appreciated.

Bill Farthing reports regarding the M.I.T. Club dinner held in New York City on December 9 that 1916 was well represented. "Our table," he says, "consisted of Mr. and Mrs. Art Caldwell, Mr. and Mrs. Walter Binger, Mr. and Mrs. Joe Barker, Jimmy Evans, Earl Mellen, Leonard Stone, Steve Brophy, and Mrs. Farthing and myself. Tom Holden and Del de Labarre were at another table with some of their former housemates. If you have any doubts as to our having reached the age of discretion, all you would have to do that night was to look around and observe the demeanor of our table compared with that of some of the younger classes." I'm sure Bill meant "age of distinction."

M. E. Strieby, VI, reports that he is still with the Bell Telephone System and still living on the side hill in Maplewood, N.J. His present job is that of staff executive in the long lines department, of Ameri-

can Telephone and Telegraph Company, since he was transferred from the Bell Laboratories in 1940. The duties in this staff job are somewhat nebulous but have to do with planning for the use of new technical facilities. This includes some rather interesting phases such as the overseas telephone services, network facilities for television and frequency modulated broadcasting, and plans for service to airplanes. Microwave radio relays are perhaps the most promising new facility now under test. His two children are now fairly well grown up: his daughter is applying her artistic tendencies in the advertising field here in New York; his son, recently out of the Navy, is now in his sophomore year at Swarthmore, where he is majoring in physics.

Bob Burnap has come across, in his neat script, with the following account of his activities during the past years: "As to items for the class notes, I much prefer to be on the receiving end rather than the transmitting but here goes. This summer rounded out 30 years in the same location, the first 13 of them with the General Electric Company, Edison Lamp Works Division, and the last 17 with the Radio Corporation of America in the tube department. The explanation is that R.C.A. bought the Edison Lamp Works' plant in 1930 for the manufacture of radio tubes and that I was invited at the time to change my affections and allegiance. Most of the time since then I have been manager of the commercial engineering section with my activities changing for better or worse with the ups and downs of the country and the company. An important part of the section's activities is the preparation and distribution of technical publications on tubes. One of these, which is now in its sixth edition, is the R.C.A. Receiving Tube Manual. The fifth, which has just been superseded by the sixth, sold to the tune of nearly a million copies, with hundreds of thousands being used during the war period in the training of radio men for the military services. Another publication is the R.C.A. Tube Handbook, which is very popular with radio and electronic engineers. This book is sold on a subscription basis and has a wide circulation both in this country and abroad.

"I have also been quite active in standardization work in both trade and professional organizations and was honored last March by the Institute of Radio Engineers, which made me a fellow as a result of my work as chairman or member of numerous committees over the past years. Daughter Joan entered Edgewood Junior College this fall with the urge to become a medical assistant. She is very enthusiastic over the course, is working hard, and is doing very well. Since the beginning of the war, I have seen very few of the '16 men although Gaus and I did meet on the Lackawanna a few months ago. I should have liked to get over to the New York banquet and the '16 get-together, but they came in a crowded week. I hope these items will serve your purpose and that we shall run across one another soon."

Finally, we have the following welcome words from Dick Knowland: "I am still engaged in consulting work, although of late some of the former long-distance travel has been eliminated. In spring, summer, and

fall; Kay and I live in the Massachusetts Berkshires, where we have been well-rooted for nearly 20 years. Winters find us headquartered in Pelham Manor, N.Y., which is close to the center of activities for me. The oldest boy, Bill, is now out in the cold, working world with the Bigelow-Sanford Carpet Company. Andy, the middle one, is in his fourth and last graduate year in the dental school at the University of Pennsylvania. Incidentally, he was married this last autumn to Martha Ann Crothers of Taylorstown, Pa. Dick, Jr., is at the University of Massachusetts, in his second year. There were no aspirants for M.I.T. in the lot. Something doubtless was amiss in my selling ability. Such spare time as is available I put in at farming, reading, shopwork, tinkering with old clocks, and the proper thing conversationally. If any of the Class are passing through Goshen on Route 9 during the summer season, we should certainly like to have them stop off for a visit and something by way of refreshment. Incidentally, as an aside to yourself, I note that you have apparently succeeded in getting more news into the 1916 column." — RALPH A. FLETCHER, Secretary, P. O. Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Assistant Secretary, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

1917

Excerpts from the diary of an Assistant Secretary: January 1: The proverbial happy New Year is somewhat dimmed by the knowledge that the class notes for the March issue of The Review are due on the 20th and I have no news. Must get on the ball next week. January 5: Procrastinated as usual, kidding myself that I was busy. January 6: Telephoned Ray Stevens, expecting that he would have many items in his file. In his absence, his Secretary spoiled my day by saying there was no news. In fact, Mr. Stevens had never seen such a lack of news; but, of course, they would receive a batch of clippings from the Review Office shortly. January 7: Received a letter from some secretary enclosing one clipping, which was too lousy to bother with. She suggested that I call Mr. Lobdell, who was always a fountain of news. Followed this suggestion and learned that said H.E.L. was away on an extended trip. Talked with the major-domo of Alumni activities, Miss McCormick. Did she know anything? Yes, she knew lots of things but none of them about 1917. She said Lobby would be at the Bohemian Club in San Francisco for the week end — sounds intriguing, doesn't it?

— so sent him an air-mail letter beseeching help. January 8: Wrote Phil Hulburd asking if he would like his job back, and how did one write notes with no material? Spent a quarter of my own funds to send out 25 postal cards to some of the old faithfuls. January 9: Relaxed, with my fingers crossed, waiting for replies to my cries for help. January 10: Ray telephoned me at home about 9:30 p.m. to inquire whether I had completed my notes. What silly assumptions intelligent persons can make on occasion! He reported that Johnny de Bell and Claude Roberts had both been on a mission to Europe and had met in Switzerland. Your guess is as good as mine

as to who did the talking and who did the listening. January 12: Telephoned Tubby Strout—certainly the Class President should be helpful in an emergency. No prunes. Only the rather banal suggestion that I give another plug to Tom Meloy's moth-eaten request for more information for the Class Book and the slightly more current suggestion that Mac McGrady, Eastman Kodak Company, Rochester, N.Y., would like to receive any interesting informal pictures—negatives preferred, but glossy prints acceptable—for the same book. All such pictures will be censored by Mr. McGrady. January 13: Received a letter from Phil Hulburd in which he says, "No thanks on the job, and as how to write notes without any material, I dunno, and I never found out. Seriously, it is a stinker of a job, isn't it?" Amen. He did report, though, that Lin Noyes is planning to spend a couple of months in the West Indies and that Irving McDaniel is enjoying his retirement raising avocados, citrus fruit, and vegetables in Azusa, Calif. January 15: The first reply to my post cards from good old Strib, probably in recognition of my not complaining about his snoring when we bunked together at the reunion. He is being transferred, still with the rank of colonel (S. R. Stribling), from Ravenna Arsenal, Apcio, Ohio, to Wright Field, Dayton, Ohio, to be an ordnance officer in the Air Material Command. January 16: Ray came through with another item. He had met Joe Gargan, who is in charge of the training facilities for the Veterans Administration in Massachusetts. I heard from other sources that Joe is doing a good job. January 17: Received a card from Ray Brooks with no news, but we award him an E for effort. January 19: Went into the office this morning expecting to find my mail box filled with replies to my postal cards. Not a single one. This is the deadline date for mailing in the notes, so here they go. Hope a few conscience-stricken souls will try to help us another time. — RAYMOND STEVENS, Secretary, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, Assistant Secretary, 15 Hillside Road, Wellesley Hills 82, Mass.

1918

As winter brings the seed catalogues, so spring brings thoughts of house cleaning and perhaps of building. It is therefore appropriate that we devote a column to our architects. If we learn anything from cause and effect, we must eventually perceive that the people we were last year are inadequate for the tasks we must be able to face today. Though the news at the moment of reporting lacks official confirmation, our understanding is that Theodore P. Wright has been made vice-president of Cornell University. Thus does life demand readjustments of us. Our personalities must not be imprisoned by a too-tightly-spun cocoon of educational training. Ted Wright has made several readjustments, but always managed to maintain an A rating. He was graduated in Architecture, achieved fame in Aeronautics, and now goes on to greater glory in Administration. "Build thee more stately mansions, oh my soul."

Edward J. Shields of Boston has been retained as architect for the \$400,000 vet-

trans' housing project being undertaken to brighten this dim world for the Quincy area. He has already designed the Watertown veterans' housing project which is nearing completion and expects the first sods of earth will be turned in Quincy come the vernal equinox. As a sort of informal prerequisite to all this responsibility, Shields is himself a veteran of World War I, having been resplendent in the blue uniform of an officer in the navy. Another readjustment, leading to the climax of Quincy, was his service as clerk of the works (sounds ominous and worthy of a slight chill of fear, doesn't it?), and chief engineer in charge of construction for the Boston Housing Authority. Then, combining his preparation on the deep blue sea with his experiences building shelters on dry land, he undertook the Watertown project, perhaps rehearsing in his mind the fact that people who build veterans' houses cannot throw stones at Jack. Ho hum, we seem to have remembered our nursery rhymes in a slightly confused condition. . . . clear evidence of an unspent childhood. Anyway, here's to our architects. — GRETCHEN A. PALMER, Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Chuck Drew sent in a few notes with his Christmas message, "Just a sincere 'Season's wish' and a word of greeting to our faithful Secretary. I enjoyed a nice visit with Fred Barney recently, when he was in Minneapolis. Fred went through a bad spell, with several major jobs at the Mayo Clinic but is fortunately much better now. Louie McCarthy has forsaken his engineering training and is in the grain business."

Jack Fleckenstein announced the marriage of their daughter Joan to Stanley Kitch on November 24 at Lincoln, Neb.

Aubrey P. Ames of 1860 Jackson Street, San Francisco, Calif., writes as follows: "After spending 27 years in the Far East (three of them in a Japanese prison camp), I have now retired and just completed a 17,000-mile tour of the U.S.A., by way of getting reacquainted with my own country. Family: one wife, no children. Occupation: seeing the country. Prospective activities: indefinite. As to classmates, I visited Malcolm McKinley, now vice-president of the Tampa Electric Company, in Tampa, Fla., a sturdy citizen of the town, with a wife and three children."

Marion Daniels has retired from teaching school this year and recommends retirement as the time when "life begins."

The Gardner, Mass., News on January 8 carried a story about Roderick Bent, stating that Rod would act as instructor of skiing for the Gardner Outing Club. — EUGENE R. SMOLEY, Secretary, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y. ALAN G. RICHARDS, Assistant Secretary, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

Your Secretary received exceedingly interesting Christmas greetings from Albion Doe and from K. B. White. The Doe card, from Mr. and Mrs. and son Charles, showed a picture of their exceedingly impressive

estate in Westchester. The card from Denise and K. B. White gives a formidable list of their various addresses, which are as follows: Loss Vineyard, 1300 Manhattan Avenue, Union City, N.J.; La Coupole, 1 Villa Jocelyn, Paris, 16; 330 West 42nd Street, New York 18, N.Y.; 55 Rue d'Amsterdam, Paris, 8; and 2-A High Street, Cardiff.

A clipping from one of the Chicago newspapers shows a picture of our old friend Ki Chun looking as boyish and keen as he used to in undergraduate days. He was on a flying visit from Shanghai and is managing director of the Universal Investment Company of Shanghai and director of the China Airway Corporation. He was a passenger on the inaugural flight of a C.A.C. plane that landed in San Francisco on October 6, and he returned in November.

Austin Higgins, an Army colonel, is now at the headquarters of the Foreign Liquidation Commission, his address being A.P.O. No. 58, in care of Postmaster, New York City. John I. Hale, an Army captain, has left Montclair, N.J., and is in Knoxville, Tenn. Jack Crowley is with the National Advisory Committee for Aeronautics in Washington. Scott Carpenter, who has been living in Watertown for a good many years, tells me that he is likely to move to Hartford, Conn., as he is now associated with a manufacturing company in Wethersfield.

To date, my request for word from those of the Class who are grandfathers or grandmothers, as in the case of Dorothea Rathbone, has elicited no response whatsoever. This causes me to wonder whether classmates who are in this category are ashamed of the fact. Not being a grandfather yet, I wouldn't know.

It occurs to me that it would be mighty interesting to know how many of us have, or have had, sons at M.I.T., and if not, what other colleges sons or daughters are attending or have attended. I shall be very happy to compile statistics, but they won't mean much unless I hear from a great number of you.

Just as these notes were going to press, I received an actual written contribution, so rare and unusual an event that I hasten to give this public tribute to Scotty Wells for having enough class spirit thus to brighten your poor old Secretary's declining years. Scotty reports that Fred Brooks has retired. This causes me to wonder whether he is the first one of the Class to do so, and I shall be glad to publish the names of any others that have reached this goal. Fred confesses, however, that he has found a reliable way never to have any leisure time and that it is to live on a farm; hence we are not sure that he has really retired. Scotty is building a house in Waban, not for himself but to sell. He says it is lots of fun, and he expects to be tacking the insulation on with his own hands. Scotty's address is 24 Pine Crest Road, Newton Center. Here's hoping his good example will cause some of you fellows to come across.

Even more recently than the above, I have received word from Norrie Abbott that Carleton H. Talcott died on January 13 after being in a Connecticut hospital since September. The last I knew, Bunk was still with the Torrington Company and

had a very important position there. I need not add that this is a severe loss to the Class and one which will be keenly felt by us all. Few members were more popular than Bunk. — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

1921

William B. Scott '44, who came up to Osterville in a staff car to call for his dad and Dan Noce at our 25th reunion, will be remembered for his precise military bearing, which is exceeded only by his courtesy in sending the following note. Bill, who is general secretary of 1944, says: "My father, Stanley L. Scott, just got promoted to the permanent rank of major general, which makes me feel real good. I am sure going to have to go a long way to catch up with him now."

Alfred B. Quinton, Jr., a brigadier general in command of the Aberdeen Proving Ground, was selected for the permanent rank of brigadier general and the temporary rank of major general. He has had long experience in Army Ordnance, serving variously as product design and development officer, ordnance proof officer and auto research engineer, ordnance service of supply in France in 1918 and 1919, designer of trench warfare materiel, head of auto design and test section, deputy chief and chief of the Detroit Ordnance District, the largest in the country, and finally at Aberdeen since 1946.

General Quinton received his degree in civil engineering at Cornell and was graduated from the Army Ordnance School in 1917. He obtained his master's degree in Course II with us in 1921 and a master's degree in business administration at Harvard in 1930. He was graduated from the Army Industrial College in 1933. In addition to four service medals, General Quinton has received two decorations from foreign governments, the Etoile Noire of the French Foreign Legion of Honor and Commander of the Order of the British Empire, as well as four decorations from the United States Government, the Purple Heart, Army Commendation Ribbon, Legion of Merit, and Distinguished Service Medal.

Announcement has been made by the Navy of the promotion of Perry R. Taylor to the rank of captain. A new list of decorations for three who hold the rank of brigadier general includes the Distinguished Service Medal for Franklin O. Carroll, the Distinguished Service Medal and the Order of the British Empire for Herbert B. Loper, and the Legion of Merit and Bronze Star for Raymond G. Moses. General Loper has the Legion of Merit, and General Moses is an officer of the French Legion of Honor. Colonel Merle H. Davis has been awarded the Legion of Merit and the Bronze Star. John R. Hardin, also a colonel, has received the Distinguished Service Medal, the Legion of Merit, the Order of the British Empire, the French Croix de Guerre with palm, and the Order of Leopold of Belgium.

Armand St. M. Kreger has succeeded his father in the presidency of the Kreger Store, Inc., of New Orleans, La. Founded by Armand's grandfather in 1865, the organization originally merchandised the imported fabrics for which New Orleans was famous and later developed lines of ready-

made apparel. Armand joined the firm in 1926, becoming secretary in 1934.

An article in the Wareham, Mass., Courier tells of the sudden death on November 11 of Justin Francis Jason, owner and operator of the Jason Chevrolet Sales Company. In his 48th year, Justin had been troubled with a heart condition for some time. He was born in Provincetown, Mass., and was the son of the late Justin and Philomena Jason. He was educated in the Provincetown schools and attended M.I.T. after graduation from the Hyannis State Normal School. He taught school in Cambridge and was an instructor in the State Police before opening his automobile business in Wareham. During World War II, he was a captain in the Air Forces and served in India and on Okinawa. He was a member of the Elks, Kiwanis, and the American Legion. Surviving besides his widow, the former Blanche Clifford of Provincetown, are two brothers, two sisters, a son, Francis, 15, at home, and a step-daughter, Hope Morgan, in California.

From the New York Herald Tribune of January 18: "Mr. and Mrs. Arthur W. Skilling of Rye, N.Y., announce the engagement of their daughter, Miss Sarah Skilling, to Mr. Lewis Clark Ball, of Cleveland. Miss Skilling is a graduate of Mt. Holyoke. Mr. Ball, who served three years as a pilot in naval aviation, is attending Amherst and is co-captain of the swimming team."

For the second successive month, Irv Jakobson has been the first to report for the secretarial committee. Jake writes: "This is to report the following members of the Class who were among those present at the dinner given by the Technology Club of New York for Dr. Compton at the Biltmore Hotel on December 9: Phil Coffin, Larry Davis, Al Fletcher and Mrs. Fletcher, Doane Greene, Dan Harvey, Irv Jakobson and Mrs. Jakobson, Lyall Stuart, Jack Whipple, Mrs. Whipple, and their son. The affair was exceedingly well attended and we had a most enjoyable evening.

"Dayton Brown dropped in to see me not long ago, and I had the pleasure of sponsoring him for membership in the Manhasset Bay Yacht Club. Dayton is an aeronautical engineer with Grumman Aircraft and lives in Munsey Park, Manhasset, Long Island." Jake's shipyard in Oyster Bay, L.I., has just been awarded a contract by the Erie Railroad for the construction of a 1,000-horsepower Diesel-electric tugboat. — Another of our old salts was in the news during the annual boat show in New York with a display of Palmer Scott sailboats at Hearn's boat showroom on the Avenue of the Americas.

Sumner Hayward writes as follows: "I had a delightful Christmas card from Frank Huggins, a wood block designed, executed, and printed by him. Squeeze says, 'Tom is at Dartmouth, Sally at Wellesley, and we are settled in what had been the gardener's cottage of a big estate.' He is associated with Du Pont in Cleveland, and his address is North Woods, Macedonia, Ohio." We appreciate Sumner's holiday greetings as well as the pleasant reminders from the St. Laurents, the Kurths, Art Brambach, Dick McKay, the Stuie Nixons, the Barringers, Lark Randall, the Burketts, Bill Loesch,

George Chutter, the Munnings, Ed Farrand, the Bob Millers, and Walt Church.

Dick McKay pens a short note from Washington, D.C., to the effect that, as he says: "I am in process of getting relocated in a new position which may be in Boston, Washington, or New York. Will let you know when I have settled again." — Our dependable Portland, Ore., reporter, Architect Walt Church, informs us: "I have a letter from Kenneth A. Moores of Seattle, who writes that he and his wife recently visited the Tom Pattersons in Denver. One of Kenny's sons is married and living here in Portland, so perhaps we shall see more of the Moores!" — Bill Loesch says he had a note from Miles Zoller of Cincinnati. Eagle-Picher activities are keeping Miles on the road a great deal of the time.

Our Class Agent, Lark Randall, makes the following announcement: "This morning's mail brought in a report on the Alumni Fund by classes as prepared by its Director, Chick Kane '24. At the end of 1947, we had 87 per cent of our quota of contributors and 92 per cent of our dollar quota. We need 37 people to contribute a total of \$382 in order to end the fiscal year with 100 per cent of both quotas. This averages only about \$10 each." Lark has switched from calculus to professional advice on taxes and recommends large Alumni Fund contributions as ideal deductions for 1948.

Trev Davidson has been elected a director of the M.I.T. Club of Milwaukee. Juntaro Kawai was one of a group which planned the reorganization of the M.I.T. Association of Japan. — Phil Coffin has been endorsed by the Civic Conference Committee of his home town, Glen Ridge, N.J., for a three-year term as a member of the board of education. Phil is assistant district manager of the Aluminum Company of America in New York and has lived in Glen Ridge for the last 18 years. He has been active in Scouting leadership and was past president of the local Home and School Association. Three of his children are now in Glen Ridge schools. The oldest boy is on his way home from Army service in Japan, and the second son is attending Newark Academy. Endorsement by the unique non-partisan Civic Conference is tantamount to election.

— And it's the top o' the mornin' to you. If you still have the price of a postal card, write me now. — CAROLE A. CLARKE, Secretary, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

1922

In last month's notes we reported that J. F. Robinson had gone on a year's trip to Guam. In this we were mistaken; instead, it was Archibald F. Robertson, and we wish him well.

The news of the month is the appointment of Crawford Hallock Greenewalt to the presidency of E. I. du Pont de Nemours and Company. It is safe to say that this makes Greenie one of the world's important men. The Class extends to him its heartiest congratulations. Francis G. Davidson has been appointed chairman of the committee on relations with the construction industry of the West Virginia chapter of the American Institute of Architects at a meeting

held on January 13, according to word received from Daniel G. Hulett '42, Secretary-Treasurer of the M.I.T. Club of the Kanawha Valley. Latimer F. Hickernell has been appointed chairman for 1947-1948 of the insulated conductor committee of the American Institute of Electrical Engineers. Max J. Steinberg has been appointed chairman of the power co-ordinating committee for 1947-1948 of the American Institute of Engineers. Both of the above adives appeared in *Electrical Engineering*, journal of the A.I.E.E., for November.

The Class of 1922 practically took over at the dinner in honor of Dr. Compton sponsored by the M.I.T. Club of New York and held at the Biltmore on December 9. Ray Rundlett, President of the New York Club, presided, turning the occasion over to George Dandrow, who acted as toastmaster in his usual inimitable style. Seated at the head table were George and Mrs. Dandrow and Ray and Mrs. Rundlett. Other couples there were Charlie and Mrs. Burke, Larry Davis and his daughter Pat, Frank and Mrs. Kurtz, Fay and Mrs. Lincoln, Dunc and Mrs. Linsley, and Dale and Mrs. Spoor. Others of the Class on hand were Jack Teeter, Dave Broudy, King Crofton, Clate Grover, Paul Choquette, E. R. Hermann, Bill Mueser, Judd Payne, Sam Reynolds, Paul Ryan, Hugh Shirey, and Charlie Roll.

A cheer for Dunc Linsley, who has been appointed an executive vice-president of the First Boston Corporation and a member of the executive committee, effective on last December 31.

Clate Grover wrote the following interesting story to Sam Reynolds: "Many of our classmates will remember José Espinosa, who for a number of years has been head of the chemistry department at the University of Manila. Charlie Roll showed me a \$100 invasion bill at the dinner (Dr. Compton's at the Biltmore), saying that an acquaintance in the Coast Guard had presented it to him as a souvenir. Charlie asked the Coast Guard chap where it came from and found it had been presented to him by a man at the University of Manila. Further inquiry developed that it was our classmate Espinosa whose \$100 bill finally reached classmate Charlie Roll halfway around the world," proving that it is hard for '22 men to escape from one another.

If any of our New England brethren have any doubts as to the future of this part of the country, your Secretary suggests obtaining and reading a copy of an address by Freddie Blackall, President and Treasurer of the Taft-Pierce Manufacturing Company of Woonsocket, R.I., entitled "The United States of New England." Freddie, as a past president of the New England Council, delivered this address before the Kiwanis Club of New Haven on last April 9. It has been printed in an attractive, easy-to-read booklet and is recommended reading for those who question New England's future.

Jack Teeter is doing a job which seems important from the national point of view. He divides his time between Washington and New York, and his official job is organizing the institutional research program for the American Cancer Society. In this work he is vitally concerned with the attitude of engineers and the engineering approach to

the cancer problem. There is growing recognition of the necessity of tackling the cancer problem from an engineering angle rather than from a medical position, and this is one reason why Jack's services are of particular value.

We regret to report the death of Margaret Roberts, a special student with our Class, who at the time of her decease on January 3, lived at 262 Mount Auburn Street, Watertown, Mass.—C. YARDLEY CHITTICK, Secretary, Heard, Smith and Tenant, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, Assistant Secretary, 333 Ellicott Street, Buffalo 3, N.Y.

1923

The necessarily slow publication schedule on these notes makes them a rather unsatisfactory medium for reporting reunion plans and program details, but you can watch your mail for information as fast as it materializes. Keep your calendar before you with the dates of the reunion marked: Alumni Day at Cambridge, Saturday, June 12, and the 1923 class reunion at the Griswold Hotel, New London, Conn., from Sunday night to Wednesday noon, June 13 to 16.

The latest returns show 94 men with 41 wives and at least 15 children who are sure to be on hand: a minimum party of 150. The chances of coming are good for 61 other men who will bring at least 26 wives; hence the party may run to 237 or more. In addition, 75 said their attendance was doubtful, but not to give up hope for them as they will come if other commitments permit. Plans are being made with the idea that the reunion group will number approximately 250.

Before reporting a number of personal news items, I should ask you to remember, if you have in mind making a gift to the Institute this year in response to President Compton's explanation of capital gift opportunities, to ask that it be credited to the 1923 twenty-five-year gift fund. This fund when last reported was likely to amount to \$55,800, by virtue principally of the loyalty of the 146 members of the Class who kept up payments on their 25-year endowment insurance policies which were taken out at graduation so that a 25-year class gift could be made. I am pleased to report that, in all, 19 other members of the Class have made payments in lieu of policies lapsed or have made an outright cash gift in order to be in on the 25-year gift in some tangible way. The total of recent gifts of this sort already adds several thousand dollars to the fund. I will later report on these returns which are coming in from day to day and will of course not be complete until about June 1, when we have to make up some kind of total for purposes of reporting to the Class and the Institute. In the meantime, many thanks to those who have already contributed.

Alan R. Allen of Newark writes that he's off on a trip to Bombay but will be back for the reunion and says we can reserve a room for him right now. Most of the men coming will be from the territorial United States, because of the difficulties of foreign travel. Eduardo Icaza A., is coming from Panama City, Republic of Panama.

Several from countries in Europe have written of interest in the 25th year get-together, but most of them will not make it for reasons beyond their control. One very interesting letter from Peter Petersen, Giertsen and Company, A. S., Bergen, Norway, says, for example: "The Griswold looks very inviting, and all I can say is that I should love to be there. With the present strained foreign exchange situation in this country, however, it is out of the question. I shall instead look forward another five years. As things are now, we are really not badly off. We still have rationing of food stuffs and clothing, but rations of the former, at any rate, are quite ample. Driving of your car, too, is restricted to business hours and limited to about 25 miles from your home, with no pleasure driving. What we mainly lack, as it seems almost everyone else does, is steel for our reconstruction program and the rebuilding of our merchant fleet. All in all, we do not complain, as we see fair chances of improvement ahead. The Communist scare, which seemed rather serious in several western European countries, has passed, I believe. In Norway this has never really been a problem, as we are far too individualistically-minded to raise any kind of following for this movement. We are, of course, situated uncomfortably close to Russia, but on the other hand, we feel that hardly any country on this earth will be safe in case of a new conflict. Since liberation, Norway has had a labor government, which has been playing with socialist and New Deal ideas, but recent local elections throughout the country showed a very definite trend away from the Labor party, just as in England."

Among personal items this month: Frank J. Atwood, a colonel, has recently been named a vice-president of Remington Rand, Inc. His wartime service was in the Rochester Ordnance District.—The small and medium motor divisions of the apparatus department of the General Electric Company, Schenectady, announced the appointment of C. J. Koch to be manager of the Schenectady induction motor engineering division.—Last July, Sydney G. Walton, Vice-president of the Matson Navigation Company, was made a director of the Crocker First National Bank of San Francisco.—In December, Raymond P. Harold, President of the Worcester Federal Savings and Loan Association, was honored for having completed 20 years with the association. Leonard F. Kiley, plumbing and heating contractor of Salem, Mass., was a candidate for the school committee in that city last November.—An Associated Press dispatch for January 12 reported the death of Vladimir Karapetoff, husband of R. M. Cobb of New York. Dr. Karapetoff was professor emeritus of electrical engineering at Cornell.

About the time these notes appear, Harold B. Gray, Vice-president of the Vitreous Steel Products Company in Nappanee, Ind., reports that he will be leaving Peru for a leisurely trip back to the United States by a steamer of the Chilean Steamship lines. He calls the trip a "buggy ride." He had expected to fly via the Peruvian Airways, Miami to Lima, spending some time in Peru and northern Chile. His boat trip back will be up the West Coast and through the Panama Canal to New York.

In November, Secretary of Defense Forrestal and Vannevar Bush '16 said that a board of scientists has been assigned to the job of figuring out how a radar umbrella may be put up to warn against approaching bombers or missiles. The particular group of scientists assigned to the job is headed by Julius Stratton of the Institute Faculty.—HORATIO L. BOND, Secretary, National Fire Protection Association, 60 Batterymarch, Boston 10, Mass. HOWARD F. RUSSELL, Assistant Secretary, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1924

Your Assistant Secretary has been very much in the doldrums for the recent past and hopes that time will eventually enable him to return to his usual correspondence. If you know of some likely and willing candidate for the post, I will be the first to stand aside for the good man.

Cy Duevel, George Parker, Bill Robinson, and the imitable Chick Kane have been the main supports of our preliminary plans to get organized for our 25th reunion. If and when any of the above powerhouses should blow a fuse, perhaps some of us lesser lights can step into the breach and continue the process of pointing 1924 to the biggest and best quarter-century reunion yet held.

I can now announce the time and place of our great event. George Parker, the indomitable George, advises me that arrangements have been completed for the East Bay Lodge in Osterville (George says it's on the South Shore). They can accommodate about 200, but if the attendance should exceed that, suitable arrangements for the overflow can be made. But since the inflationary New Deal tendencies result in more spendable money than space, may I suggest that when the notice comes out you act very promptly and send in your reservation along with the mere day's pay of \$50 a reservation. Don't worry, for if you find you can't attend, your money is perfectly safe and will be refunded to you without delay. Tennis, golf, swimming, and riding are available. We will give you full details in this column as they develop.

The main thing, as I see it, is the importance of doing something really worth-while for the Institute. We must not fail. We are in the unique position of being able to make the most outstanding gift to Technology that any class has ever done, thanks to the forethought of our class officers some years ago. But we have not lived up to our expectations, and there is a considerable shortage in funds to be made up. Let's get together, for the sake of 1924, and put up some generous support for M.I.T. This can be managed without too much pain or sacrifice to the individual members of the Class if only we have the co-operation of each and every one. So, if you are among the fortunate few who have maintained their class insurance policies, you are to be congratulated and honored, and if you want to take advantage of the donation laws at the same time you help us come along, you will feel the immense satisfaction of having done all you can both for your Class and for the Institute. If you are among the majority who have let their insurance policies lapse, then certainly you will want to do your share toward our

obligation by making a direct gift of not less than \$250 and better still, one grand. Remember, fellows, you can't take it with you, and the knowledge that you have contributed to a worthy cause and one that may help perpetuate the very existence of these United States will be a good feeling to have.—FRANCIS A. BARRETT, General Secretary, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, Assistant Secretary, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

1925

Following is an accumulation of several months of notes which I have collected during the summer and fall. I am sorry you have looked in The Review in vain for this information, but I shall try to make amends during the rest of this volume by getting everything in promptly.

The first item is one which appeared in the New York *Herald Tribune* on January 7, a year ago: "Election of three new vice-presidents and directors of Standard Oil Development Co., announced . . . by the management of that central technical and research organization of Standard Oil Co. of New Jersey, is a step to meet requirements of expanding research and development, a company spokesman said. The new officers, who increased the number of directors from eleven to fourteen, are Willard C. Asbury, who will be in charge of contract and patent activities. . . . Mr. Asbury, a graduate of . . . Technology, joined Standard Oil of Louisiana in 1927 and since 1929 has been associated with the Development company."

One of two deaths which I have to report is given in the following item from the Fall River *Herald News* of June 25: ". . . Raoul R. Gamache, 49, brother of Philip and George Gamache of Fall River, Mass., a native of Fall River and former employe of the research division of General Electric Co. here, died . . . [June 20] in Ellis Hospital. A mechanical engineer for 23 years at GE, Mr. Gamache was graduated from . . . Technology in 1925. He served in World War I with the engineers corps. Other survivors include his wife, three sons, and five sisters."

A letter from our Assistant Secretary, Doc Foster, in July read as follows: "Clarence Thulin, whom you knew well as a student, dropped in on me . . . and we had a very nice visit together. He has been with Bigelow, Kent, Willard and Company, management engineers of Boston, for the past six or seven years. Although he has maintained his home near Boston, he has been out of town a greater part of the time since going to work for this company. He spent a year or so in South Carolina and Georgia and another extended period in the vicinity of Tacoma, Wash. During the past year or so, he has been spending most of his time in the vicinity of New York City and parts of New Jersey and commuting to Boston on each week end. Although his work at the Institute was in the field of electrochemistry, he seems to be doing pretty well as an industrial engineer."

In the column "Capitol Spotlight" of the *Baltimore Afro-American*, the columnist mentions the fact that James C. Evans of

our Class succeeded Marcus Ray in the latter's (unnamed) position in the War Department.

The August 21st issue of the *Revere*, Mass., *Journal* carried a news item to the effect that Michael Lepasio was running for the office of city treasurer in Revere. We have no further information about Mike's candidacy and must assume, since we should probably have heard of it had he succeeded, that he did not win the election. If the contrary is true, however, and Mike will write in, I shall be glad to publish the results.

In the August 29th issue of the *Portland, Maine, Press-Herald* the Bath Iron Works had an announcement that G. Baer Connard, who had been general manager of the shipyards during the past several years, was to be technical assistant to two of its vice-presidents. He is a director of the corporation, has been with the firm since 1929, and is a member of the Propeller Club of Portland.—The *Boston Herald* of October 12 printed a picture of Chet Trask with the following caption: "Guest speaker at opening meeting of North Shore Simmons Club Thursday at 8 P.M. in Hamilton Hall, Salem, will be Col. Henry C. Trask of Medford, recently returned from Europe." This is the first information we have received that Chet is turning into an orator, but you never can tell what a Tech graduate will do.

On October 17, I received word from Doc Foster that Gus Marsh had died on August 11. This was followed by a memorandum from Professor Locke with a little more detail about his history. I quote from both informants: Doc Foster's letter—"I have a few items to pass on to you. I clipped the enclosure from the *Sunday Herald* a few days ago and pass it on to you for whatever use you can make of it. I am also sorry to report that Gustave A. Marsh died suddenly on August 11. I have no details, but it came as quite a shock since Gus had dropped into the office not more than two weeks before, and we chatted for a few minutes." Professor Locke's letter—"Gustave Arnold Marsh, manager of the G. A. Marsh Company, manufacturers, of Arlington, Mass., died on August 11. A native of Cambridge, Mass., where he was born in 1903, he received his B.S. degree in Metallurgy from M.I.T. in 1925. He worked for nearly a decade with the Hood Rubber Company of Watertown, Mass."

Another item from the Fall River, Mass., *Herald News* reported the retirement of William C. Vose of Lynn from active naval duty at the Naval Torpedo Station at Alexandria, Va. The following excerpt will supply the details: "A native of Fitchburg, Captain Vose was graduated from Annapolis in 1918. He studied ordnance engineering at the Naval Academy's postgraduate school and at M.I.T., where he received the degree of Master of Science in 1926. He was commander of the Navy's submarine base at Cavite in the Philippines from August, 1926, until March, 1929. In July, 1940, he was assigned to the Naval Torpedo Station at Newport, for duty as designing officer and later for assignment as procurement engineering officer negotiating price agreements for contracts for torpedo parts. In 1943 he was named officer in charge of the Central Torpedo Office at Newport and in June,

1944, assumed command of the U.S.S. *Vicksburg* at Newport News, Va., when the ship was commissioned. He is 51 years old."

The following letter from K. C. Reynolds, which was sent in to the Alumni Association and forwarded to me, is quoted in full: "To bring your records up to date—since last July, I have been a professor of civil engineering and head of the department of general engineering of the University of Southern California. Besides being in charge of the hydraulic laboratory, I am supervising the laboratory of the research foundation of cross-connection control. We have nearly 2,000 day engineering students with about 300 seniors in civil engineering. I am greatly enjoying these new associations."

Since you last heard from me, I have become assistant to the personnel director of Olin Industries, Inc., which may be only a technical promotion but it sounds well on paper, anyhow. During the early part of the summer, I attended the summer workshop in group development at Bethel, Maine, co-sponsored by the M.I.T. Research Center for Group Dynamics. Since this took the place of my usual vacation, I had no opportunity to visit around in the East and look up members of the Class, and so have no personal interviews to report at this time.—HOLLIS F. WARE, General Secretary, Box 52, Godfrey, Ill. F. LEROY FOSTER, Assistant Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

1926

A classmate who has achieved distinction in the welding field is George S. Mikhalapov, manager of the apparatus research department of the Air Reduction Sales Company, Murray Hill, N.J., who last fall gave the Adams Lecture at the annual meeting of the American Welding Society in Chicago. During the war, as supervisor of welding research for the war metallurgy committee of the National Research Council, he had direct supervision of some 31 welding research projects conducted in industrial and educational laboratories throughout the country. In 1941, he made a survey of the practices of spot welding aluminum alloys in the aircraft industry and drafted a manual later adopted by the American Welding Society as an emergency war standard for spot welding of aluminum alloys.

Earl Wheeler has operated his own construction company in Hartford for the past several years. As if that did not furnish enough headaches in these days, he has recently been elected secretary of the Connecticut chapter of the Associated General Contractors of America.—Edmund Bromilow, who continues with General Electric in Ancon, Canal Zone, expects to return to the United States for a short vacation in May. Here's hoping that the snow will be off the ground in New England by then. In a letter to Eben Haskell, Brom said: "If for any reason you or the gang find yourselves passing through the Canal Zone, my office telephone is Balboa 3590 and my house is Panama 1862-A."

Two of our Army officers have new assignments: Colonel Robert W. Daniels is with the Ordnance Department at Letterkenny Depot, Chambersburg, Pa., and Major Arthur C. Fuller is with the Reserve

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Officers' Training Corps unit at Alabama Polytechnic Institute. Charles Shea is a civilian at the Army's engineering research and development laboratory at Fort Belvoir.

Of our former naval officers, we learn that Stuart John is a consultant in the rate department of Ebasco Services, New York, and that Waynard Vosper is president of V-Mac Industries, Guilford, Conn. Two of our Army officers who have resumed civilian attire are William H. Dargan, former Air Forces major, who is now a chemical engineer with Babcock and Wilcox in New York, and Edmund P. Capone, former lieutenant colonel, who is now superintendent of construction with the Veterans Administration in Boston.

Lyman Billings and Curtis A. Whiting '29, have started a new business—the Industrial Oil and Chemical Company—in Milford, Mass. Gustave Magnus has joined the fourth estate through editorship and ownership of the News Publishing Company in North Hollywood, Calif. To the ever growing list of vice-presidents among our classmates can be added the names of John Schaefer, now with the Ethyl Corporation, Baton Rouge, La., and Edgar O'Neil, Vice-president in charge of research for the Watson Elevator Company, Englewood, N.J. Classmates will be interested to learn that Thomas R. Montgomery is Indiana sales manager for the Acme Sponge and Chamois Company and that Ralph F. Blake is port engineer with Roland and Cornelius in New York City.—JAMES R. KILLIAN, JR., General Secretary, Room 3-208, M.I.T., Cambridge 39, Mass.

1928

After nearly 20 years of silence, word has reached your Secretary of the doings and whereabouts of Pete Moyano, I. Pete is general superintendent of a construction company in the Philippines. In a letter he says: "I am finding the work increasingly interesting as each day passes. Of course, our few typhoons sometimes interrupt us, but according to our Daily Pacifican newspaper, you are having your share of weather trouble, too, by being 'snowed under.' I've been here for several months, and have become so acclimatized that the much-discussed weather doesn't even phase me. I have not, however, gone completely native."

Jack Connelly, II, has recently been appointed vice-president of the York National Bank and Trust Company of York, Pa. Jack writes us that he and Mrs. Connelly are leaving shortly for a trip to the Caribbean before assuming his new duties. Before joining the York National Bank and Trust Company, Jack was a partner and manager of the Golden Rule, a leading store in York. Congratulations, and the best of luck in your new job.

Possibly by the time you men read these class notes you will have received the first mail piece on the forthcoming 20th reunion, scheduled to be held at Wianno on Cape Cod on June 25, 26, and 27. For the purpose of reference, however, I am listing below information which Ralph included in the publicity piece. Roland Earle's committee plans to have the reunion begin officially with a dinner on Friday evening and continue through Sunday noon. All

men are urged, of course, to come as early as possible on Friday. Listed below are men throughout the country who have agreed to act as "information centers" and can probably be of assistance to each man in the Class in arranging transportation to and from Wianno: New York City: George I. Chatfield, 49 Eton Road, Larchmont; Raymond L. Wofford, National Biscuit Company, 449 West 14th Street; New York State: Benjamin K. Hough, Jr., 237 Renwick Drive, Ithaca; Philadelphia: Robert M. Harbeck, 605 Foss Avenue, Drexel Hill; Pittsburgh: Arnold A. Archibald, R.D. 2, Thorn Run Road, Coraopolis; Washington, D.C.: James A. Allan, J. A. Allan Company, 1018 Vermont Avenue, Northwest; Wilmington: E. Vernon Lewis, 109 North Road, Lindamere; Knoxville: George P. Palo, Tennessee Valley Authority, 202 Union Building; Cleveland: Gerard V. Patrick, R.F.D. 3, Chagrin Falls; Detroit: Francis H. Rutherford, Apartment 201, 1505 Delaware Street; Chicago: Joseph W. Gaffney, Apartment 3-A, 211 North Marion Street, Oak Park; Minnesota: William I. Gorinkle, 503 Fairview Street, Austin; California: Henry B. Dean, Star Route, Bonsall; Washington: Gilbert J. Ackerman, American Mail Line, 740 Stuart Building, Seattle; Texas: William H. Woods, 5420 Bellaire Boulevard, Post Office Box 13, Bellaire; Mexico: Walter J. Nock, American Smelting and Refining Company, Santa Barbara, Chih; Canada: Rene Simard, 165 Morrison Avenue, Montreal 16, Province of Quebec.

The next publicity piece will carry complete information on air and train schedules to and from Wianno. Plan now to attend the only 20th reunion you will ever have. Remember it's a date—with '28—at Wianno on June 25, 26, and 27.

Roland Earle's committee, at the writing of these notes, consists of the following: Slim Maeser, Jim Donovan, Walt Smith, Bill Bendz, Bill Kirk, Bill Carlisle, Chet Day, and Ralph Jope.—GEORGE I. CHATFIELD, General Secretary, 49 Eton Road, Larchmont, N.Y.

1932

This time it is our duty to bring to your attention the accidental death of William Raymond Power, Jr., VI-A, on the third of last November. His wife has written as follows: "While dressing, he slipped on the rug and fell, striking his head on the chest of drawers. The operation to eliminate clots and bleeding was thought to be successful but proved otherwise. Services were held at St. Andrews Chapel, National Presbyterian Church. He was interred in Arlington on November 7." Those of you who knew Mr. Power will probably wish to write his wife. Her address is 4301 First Street, Southeast, Washington 20, D.C.

Rolf Morral, metallurgist for the American Cyanamid Company, is chairman of the Wire Association's program committee. At the 18th annual convention, last October, he arranged a symposium on the "World-Wide Wire Industry." William H. Radford is chairman of the Boston section of the Institute of Radio Engineers. Robert H. Clary writes that he is in Forestville, Conn., with the Arthur G. Russell Company, an engineering development outfit. Art Russell is a classmate.—CLARENCE M.

CHASE, JR., General Secretary, 1207 West Seventh Street, Plainfield, N.J. Assistant Secretaries: CARROLL L. WILSON, United States Atomic Energy Commission, Washington 25, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1938

First, don't forget our 10th reunion coming up this June, the 10th through the 12th. You will get further details soon, but remember to save the dates.

Two more of our classmates have finally fallen for woman's ways. On October 11 of last year, Paul O'Connell married Marie Brissette in Melrose, Mass. Paul served in the Army for four years and is now employed by E. B. Badger and Sons in Boston. He and his wife are living in Quincy. The second was Ralph Lebow, who was married to Marcia Wilson in Boston on Thanksgiving Day. Ralph is working in Boston and they are living in Brookline.

Our General Secretary, Dale, and his wife, Jeannie, had a particular reason for sending out Christmas cards this year, because of Watson Drake Morgan, born on December 21. Congratulations to you both. An announcement comes from Tenney Clough, also. Tenney and his wife, Cecelia, had their first child, Alan Tenney, born on November 22. The proud father writes that he is now back with the Nashua Gummed and Coated Paper Company in Nashua, N.H., where he is in charge of plant and machinery maintenance, and that they live in Amherst, N.H.

John Craig is at the Bell Labs working on radio-telephone equipment design, especially the new mobile service. His job involves the preparation of manufacturing requirements and specification for use by Western Electric and associated telephone companies. Forrest Judkins is supervisor of tests for the General Electric Company in their high voltage lab in Schenectady. When Forrest finished at school, he went to the Pittsfield Works of the General Electric Company, where he took a three months' power transformer test, a six months' sign-up (G.E.'s method of denoting a longer test period), and a three months' test in the lab's electrical engineering section, where he remained as a permanent engineer. While there, he was associated with the special measurements section, became head of the lab's equipment engineering section, and finally was appointed supervisor of tests of the Pittsfield Works, East Plants, and plants in Fort Edward, N.Y., and Holyoke, Mass. Forrest has received two patents: the first, in 1941, a patent on a vibration-free mounting for the contact-making voltmeter, no doubt a combination product of 600T and 207; the second, in 1943, was one of several patents on a rather ingenious machine for inspection of castings by projection. This involves the making of film slides from exact drawings of the casting to be projected on the face of the casting, thereby making possible the marking of the casting for proper size, location of drillings, and so on.

William Kashdan is now with the Textile Research Foundation at Princeton University, where he is working under the contract from the Office of Naval Research. Edward Bodeau, who received his master's

degree with us and is now a lieutenant colonel, has recently assumed command of the supply division of the Eighth Army Ordnance Section in Yokohama, Japan, it was learned here. His division is responsible for the delivery of all ordnance equipment to units of the Eighth Army in Japan and Korea. Rolland French presented a paper entitled "Physical Metallurgy of the Non-ferrous Alloys" at a meeting of the Engineers Club at Bridgeport, Conn., on November 5. Rolland has been taking advanced studies at Yale University since he finished with us and is working with the Bridgeport Brass Company. He is also an instructor for the Bridgeport Engineering Institute and is vice-chairman of the Connecticut section of the American Institute of Mining and Metallurgical Engineers. Horace Homer is married and living in Arlington, Mass.; he is a senior engineer with the Sylvania Electric Products, in Salem.

Finally, we have heard from H. B. Kane '24 that there are some copies of the 1938 "Technique" available at four dollars a copy. If any of you should wish a new copy, kindly write directly to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass., and make checks out to Technique. — DALE F. MORGAN, General Secretary, Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York, N.Y. ALBERT O. WILSON, Jr., Assistant Secretary, 32 Bertwell Road, Lexington 73, Mass.

1941

Along with the New Year comes news of '41 milestones. Next summer Louise Gaus will become Mrs. George White. Louise was graduated from Vassar College and is now studying for her Ph.D. at Bryn Mawr. George, at present, is studying at the Harvard Business School. Adele Benziger is engaged to Richard Markey, Jr., who served with the Navy in the Atlantic and Pacific and was discharged with the rank of lieutenant commander. On October 17, Eleanor Smith, who was graduated from Smith College, became the bride of Harry Quackenbos, Jr. The couple are living in Orange, N.J. The same week, Priscilla Van Loan, a graduate of Russell Sage, was married to Richard Tindal, who is a staff member of Arthur D. Little, Inc., Cambridge. In September came news that Germantown, Pa., would be the future home of Edward Hurst, who, during that month, took as his wife the former Elizabeth Barker. More September wedding announcements inform us that Evelyn Alm was married to Carl W. Streed; and Margery Miller, Wellesley graduate and author of *Joe Louis: American*, was united in marriage with Jack Kriz.

Included in our best wishes to the newly engaged and married members of the Class is a vote of congratulations to Robert Fletcher, who was awarded by the Army a document of appreciation for his work as a weather consultant to the Air Weather Service during 1944-1945. The award to Dr. Fletcher, now chief of the hydrometeorological section of the United States Weather Bureau, declared that "his contribution to the development of weather forecasting techniques in the China-Burma-India theater, Panama, and the United States aided materially in the achievement of victory in World War II."

For the first time in five years, we have received news from Mac McGuire, who, while employed in the research laboratories of the Sperry Gyroscope Company in Long Island, married Marian Flint and later took on paternal responsibilities toward Susan Flint McGuire. Since then Mac has become sales engineer for the Cooper Bessemer Corporation and lives in Port Chester.

Bill Orr writes as follows: "Leaving Tech in June, 1942, after receiving my master's degree in Economics and Engineering, I accepted a position with the Firestone Tire and Rubber Company, agent for the Rubber Reserve Company, doing development work in synthetic rubber. In January, 1944, I, in effect, transferred to the University of Akron, agent for the Reconstruction Finance Corporation, and assumed the position of superintendent of pilot plant of Government Laboratories. The occasion for writing you now is my resignation from this position to join the research and development division of the Western Cartridge Company at East Alton, Ill. Among other advantages in this move is the fact that I will be within 30 miles or so of my home at 311 Bristol Road, Webster Groves 19, Mo. I am still batching it and probably will live at home for a while before moving to East Alton. Since coming to Akron, I have seen Elmer Greenleaf and Pierre Hartshorne. Elmer was working with us for a while and then took a position with Goodyear. Pierre was out here on interview, but I do not know where he finally became located. Herman Gabel is with the Erie Electric Company at Buffalo. I had occasion to visit with him, Jean, and their daughter, Chris, last spring. Christmas cards received advised that Leon LaBombard is now living in Nashua, N.H., presumably working with his father. Gene Lawrence was out of the Army and might go to Maine, his wife's state. Walter Turansky is married and is working for the Associated Construction Company in Hartford. A card from Fred T. Coder included a picture of two fine youngsters. The envelope was postmarked 'Haverhill,' where, it seems, he is with Western Electric. In my graduate year, I roomed with Bill Watkins and Al Waggoner of the Class of '42. The last heard from Bill was that he was living at home in Southport and working for a corset factory (appropriate job for a naval architect). Al Waggoner is at Johns Hopkins and living in Bethesda."

Les Corsa writes "George and Ardy Clark had a son, Junior, on December 26 by the way. Vern Kyllonen, who tried to convince me in July that he was a confirmed bachelor, admitted at Christmas that he was "courtin' and gettin' engaged." — Our best to Ivor Collins, whose name is linked with that of Shirley Rhea in the engagement column of a Schenectady paper. Ivor served as a lieutenant in the Navy and is now employed in the engineering-rotation program at the General Electric Company. Ivor has been very helpful to us in preparing this column, and we want to go out of our way to wish him the best of luck."

We are sorry to report that there have been two losses in the Class: that of Paul R. Stone, whose father sent in the news of his death (giving no details), and of Major Cullie B. Harris, who was killed in

a plane crash on August 12. To both their families, the Class extends its sincerest sympathy. — STANLEY BACKER, General Secretary, 101 Providence Road, Primos, Pa. JOHAN M. ANDERSEN, Assistant Secretary, Saddle Hill Farm, Hopkinton, Mass.

1942

Warren Loud, the former writer of these notes, sent me a short note. He is enjoying life at the University of Minnesota. During the Christmas vacation, he married Mary Lou Stroaburg of Boston. Jack Iams is now with the American Consulate in Athens. I expect to write to Jack shortly and I am sure that we all will be interested in getting a first hand account of that troubled country.

Joe Welsh is scheduled to leave Shanghai soon for his home in Portland, Maine, after completing two years of service with the United Nations Relief and Rehabilitation Administration in China. Joe went to China as a lieutenant in the United States Army and served as an airfield construction engineer for the famed 14th Air Force. After being discharged in Shanghai in 1945, he joined the U.N.R.R.A. and was assigned as a highway construction engineer to the National Highway Administration. To further the reconstruction of China's war-torn highway system, the N.H.A. established a training and assembly station near Shanghai where some 500 carefully selected Chinese mechanics were instructed by Welsh and other U.N.R.R.A. technicians. He must have had many interesting experiences in this work, and we hope that we can get him to write us a letter and tell us something of them.

On January 7, we lost a member of our Class, Daniel J. Degen, who died after a thyroid operation. At the time of his death, Dan was employed as an engineer by the Comstock Canning Company, at Newark, N.J. After graduation, Dan was employed by the Allis-Chalmers Manufacturing Company in Milwaukee. He left that firm to join the Navy. On December 15, 1946, he was married to Doris E. Ellsworth, and on December 8, 1947, they had a son, Frederick Charles. If any of Dan's friends should want to write to Mrs. Degen, the latest address we have is Leonardsville, N.Y.

Bob Imsande dropped us a note to tell us that he and his wife are now the proud parents of a baby girl born on January 2. Mother and daughter are doing well, he says, but the father is still a little groggy. He enclosed a clipping about the marriages of George Saathoff and Wilfred Shaw, which we mentioned in the last column. He makes this comment: "Incidentally, this [Rutherford, N.J.] is a fairly small town, population 15,000, yet three out of our Class of about 500 are married or engaged to Rutherford girls. If my math isn't too far off, based on a total population only a 20-to-1 chance existed for a Rutherford girl to marry a '42 man, yet at least three of them have or will do so."

Milt Platt, who received his Sc.D. from the Institute in 1946, has been appointed assistant director of research of the Fabric Research Laboratories, Inc., in Boston. — Dan Hulett sent us some news. Art Power, who is now in the engineering department of the Carbide and Carbon Chemicals Cor-

poration at South Charleston, W. Va., will be married in the spring to Mary Elizabeth Swint of Charleston. Warren Twaddle is now with Stanolind and Ted Eliot in Tulsa. Finally, Hulett reports that Harry Knox is with the E. J. Lavino Furnace Company, in Philadelphia.

Paul Hotte, who worked with G.E. while in VI-A, is now situated in St. Paul with the Engineering Research Associates, Inc. He seems very enthusiastic about his job, which is mostly administrative and planning work.—Charlie Lawrence, Mark Kravitz, Bill Foley, and Vince Stumpf have all been recently married. From the number of marriages I have already reported in the short time that I have been writing this column, it seems to me that there can't be many bachelors left in the class of '42.—JOHN W. SHEETZ, Acting Secretary, Room 3-108, M.I.T., Cambridge 39, Mass.

1943

No news is probably good news, but here goes anyway with what little we have for this month! Marie Lewis Holden's parents have announced her engagement to William G. Scola. The prospective bride's home is in Supply, N.C.; and Bill, who is vice-president of Angelo Scola Company, Inc., lives in Worcester, Mass. November 22 was the wedding day for two of our Class. The first ceremony, which was held in St. George's Protestant Episcopal Church in New York City, was that of the former Daphne Pike and John P. Gratiot. William G. Post, Jr., was best man; and Walter A. Boyd, one of the ushers. The Gratiots expect to make their home in New York. The second wedding took place at the Protestant Episcopal Cathedral of the Incarnation in Garden City, Long Island, where the former Ann Elizabeth Graves and Gregory G. Gagarin were married. Classmates Bruce Horst and Stewart Hill were best man and an usher respectively. The Gagarins are now living in Philadelphia.

My only letter this month is from Stan Proctor, who writes as follows: "I am not sure whether I wrote about changing my name. Well, last summer my name was changed from Porosky to Proctor. As of the first of December, the General Electric Company transferred me from Schenectady to Cleveland as a lighting specialist. My work consists of a tremendous amount of traveling, and the products I am most interested in promoting include street lighting equipment, traffic signals, airport lighting, and sports lighting. My wife and I were fortunate in finding an apartment in Shaker Heights two weeks after arriving here." How about telling us how you worked that?

A few days ago you received a double postal card, which I have sent to you in order to get a rough idea about how many will be able to attend a five-year class reunion dinner in Boston on June 11. I shall appreciate your returning the cards to me promptly so that I may make definite plans for the festivities.—CLINTON C. KEMP, General Secretary, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

1944 (2-44)

Risto Hukki writes from Helsinki that he is now head of the new department of mining and metallurgy in the Finland Insti-

tute of Technology. His present enrollment of 91 students is too large in number. It has been brought about because of the war years when new students were accepted but very little teaching could be done, so that now the majority of those veterans are able to receive their education. Apparently everything is not entirely rosy, and he and his associates have troubles and worries, but they are optimistic and feel that they will ultimately pull through all right. During his stay in Finland, Risto has acquired a wife, as of last fall.

A letter from Jack Barmby tells of his activities at Hampton, Va. He is working for the National Advisory Committee of Aeronautics down at Langley Field. Jack states that Herb Cunningham is there also. Herb joined the organization after getting his master's degree from Tech last year. Hank Alden is still working at the Institute and has received a master's degree. Dumont Rush is at the Institute now. Jonathan Edwards has obtained his master's and is now on the West Coast.

Here are some of the latest changes of address: John Adams, Buffalo, N.Y.; Bob Arnold, M.I.T. Graduate House; Bob Cooper-Smith, Alton, Ill.; Kjeld Damsgaard, Chester, Pa.; Paul Ely, Chicago, Ill.; Stan Felix, Atherton, Calif.; Warren Howard, Malden, Mass.; Dave Jealous, Schenectady, N.Y.; Edmund Jonash, Cleveland, Ohio; Ken Joseph, Southampton, Mass.; Bruce Kingsbury, Ipswich, Mass.; Pete Marenholz, Martinsville, N.J.; Henry Noyes, Berkeley, Calif.; Lt. Ed Peterson, Binghamton, N.Y.; Don Phillips, M.I.T. Graduate House; and Ken Rehler, Watertown, Mass. Ernie Schoenwald was graduated from the Harvard Business School last June and is now located in Lakewood, Ohio.

Tsung Tsu is in the engineering experiment station of Pennsylvania State College. James Acteson is in Seattle, Wash. Mortimer Meyer married Jean Lewis of London, England, in December. They were married in England but will live in New York, where Mort is employed as a structural engineer by the Sanderson and Porter Company. Marion Thornton of North East, Pa., is engaged to Stanley Skelskie as of last December. George Barr was married to Mildred Marks of Chestnut Hill, Mass. She was graduated from Cambridge Junior College and Cornell University.—WILLIAM B. SCOTT, General Secretary, Mellon Hall C-41, Harvard Business School, Boston 63, Mass.

1945 (10-44)

Most of the news in this issue I've had to ferret out during my limited wanderings in and around New York State. You and I are all interested in what's happening to our friends living outside this short grapevine. All national and international correspondents are cordially invited. One of the best turns you can do for a friend is to help him blow his publicity horn. And while you're about it, why not give this instrument a try?

Just before the holidays, Ken Scheid was in Buffalo for a two-weeks' survey of the general operation and personnel at the General Mills plant. After receiving his M.B.A. from the University of Chicago, Ken began with the General Mills industrial relations department in Minneapolis, Minn. His

present project of job evaluation and standardization will take him to the company's major mills throughout the country. Ken had had a recent letter from Cort Ames, embryonic executive at Harvard Business School, in which Cort spoke of his budding love. Soon after, its blossoming qualified him for the announcement section below. The letter also included news of our globe-trotting Class President. John Hull served in the Navy at Guam and the Marianas as an aircraft instrument specialist officer. Upon release from active duty, his appetite for the East was unsatisfied. In June, 1946, John joined the United Nations Relief and Rehabilitation Administration in Shanghai. He was assigned to the Chinese National Relief and Rehabilitation Administration Highway Transport, an agency operating under the joint auspices of U.N.R.R.A. and the Chinese Ministry of Communications to provide trucking facilities for the distribution of U.N.R.R.A. supplies. As a division supervisor, John served at the regional stations of Kaifeng, capital city of the interior province of Honan, and later in Mukden, Manchuria. Last spring he met and married the former Margaret Baxter of Albury, New South Wales, Australia, also a U.N.R.R.A. worker in China. When the Highway Transport had completed its mission, John was assigned to the U.N.R.R.A. Agriculture Program in Shanghai. There, as of last September, he was supervising the assembly shop, which assembles all the farming and irrigation equipment. More recently, I learned that John and his wife were to have left China last November. They should by now have reached his home in Waverly, Pa.

A football week end at Lehigh produced some news from our half brother and full-fledged fellow Alumnus. Gil Murray married the former Winifred Tripping of Seattle last June. Gil and Charlie Sollenberger will have received their M.S. in Chemical Engineering this January and will afterward work for Allis-Chalmers in Milwaukee. John Mathews has planned to take the same degree to Venezuela for one of the large oil companies. B. J. Duffy is well on his way to a Technology doctorate. Tom Lawson is engineering new developments for Charles Pfizer and Company in Brooklyn, N.Y. George Butter is married and has been working in the Division of Industrial Cooperation at the Institute. Bill Plunkett is selling in Boston for one of the leading pump manufacturers.

At the recent Chemical Industries Exposition in New York, more news presented itself. Gordon and Jackie Findlay proudly described their almost one-year-old Jim. You'll probably remember the former Jackie McLean as one of our Class's coeds. Chris Boland is working in development and sales service for Distillation Products, Inc., of Rochester, N.Y. Bruce Mayer is selling for Wood and Preuit Engineering Equipment Company of Philadelphia, Pa. Al Porson is training for sales with Phelps Dodge, and Dick Weaver is with American Cyanamid in New Jersey.

At a recent meeting of the M.I.T. Association of Buffalo, I saw Jack Toland, who, after his years in the Army, returned for graduation last June. He is now engineering for Electromet of Union Carbide in Niagara

Falls. A recent chance acquaintance on a ski slope turned out to be a co-worker of Ted Hellmuth. Ted, immediately after emerging from the Navy, sold nationally for a vending machine manufacturer. Later, he finished at Lehigh and began work in the technical sales and service department of the machinery division of the St. Regis Paper Company. After a few months in Oswego, N.Y., he was transferred to Birmingham, Ala. From someone who recently saw him, comes news that Bob R. Smyth is now working in the engineering department of the Ritter Products, Rochester, N.Y.

Among recent happy marriages are the following: Joan Brown of Meyersdale, Pa., to Greg Walsh; Elda Signan of New York to Michael P. Lagana, who is now studying at the Institute for his master's; Marie Grace Li of Pine Manor, Skidmore, and Long Island, N.Y., to Gordon Chun of the Wahca Dye Company; Marguerite Carell of Regis and West Medford, Mass., to James H. Grimes, Jr.; and Doris Mansur of Katherine Gibbs and Spencer, Mass., to Cort F. Ames, 3d. About publication date in April, that is, the 3d, Dorothy Phillips of Pratt Institute and Richmond Hill, N.Y., will marry Bill Henderson, who is now

with the Carrier Corporation in Syracuse.

If you're coming to New York, let me know in advance. We can get together for a trade of personal histories. But if you can't make this date, then do write.—
JAMES S. MULHOLLAND, JR., General Secretary, 1172-77th Street, Brooklyn 28, N.Y.
Assistant Secretaries: RODERICK L. HARRIS, 2873 South Buchanan Street, Fairlington, Arlington, Va.; JAMES B. ANGELL, M.I.T. Graduate House, Cambridge 39, Mass.

1946

The fine response accorded your Secretary's plea for information strikes one discordant note in that most of the news gets documented rather late. It is hoped, however, that the items in The Review will serve their purpose of disseminating information about the Class and provide more news than old stories.

Mr. and Mrs. Lotfi Zadeh are the well-initiated parents, we hope, of a daughter, Stella, who will be a year old this July. The Ted Malms and daughter, Karen Yvonne, are living in Berkeley, Calif., where Ted is teaching business administration at the University of California. Chuck McKinney writes that he and his wife, the former Diana Sullivan (married three hours

after graduation), spend a lot of time taking care of offspring Linda Stuart. Chuck argues that he's working hard raising cattle, but, as he says, "Who ever heard of a Virginian working?"

Announcement has been made of the engagement of Clara Everett to Frank Low. Frank completed study in graduate physics and is now at the Harvard Business School.

— Engagements are noted of Mary Owens of Port Washington, Long Island, to Richard Steuer, Marion Truesdell of Littleton, Mass., to Bob Toperzer, and (almost scooping the press) of Diane Harrington of Montpelier, Vt., to Jim Craig.

One of the two recent weddings that we wish to chronicle is that of Shirley Dadkin of Malden and Mason Lappin, which event took place on October 19 in Roxbury. The other is the wedding of Elizabeth McNally of West Concord and James Finnigan.

Chuck Wellard has received his master's degree from Carnegie Institute of Technology. Bob Fried, after finishing work for his master's, spent the summer at Oslo University studying political science and the Norwegian language.—JAMES S. CRAIG, General Secretary, Morris Hall, D-41, Harvard Business School, Boston 63, Mass.

REMEMBER THE DATE

Saturday

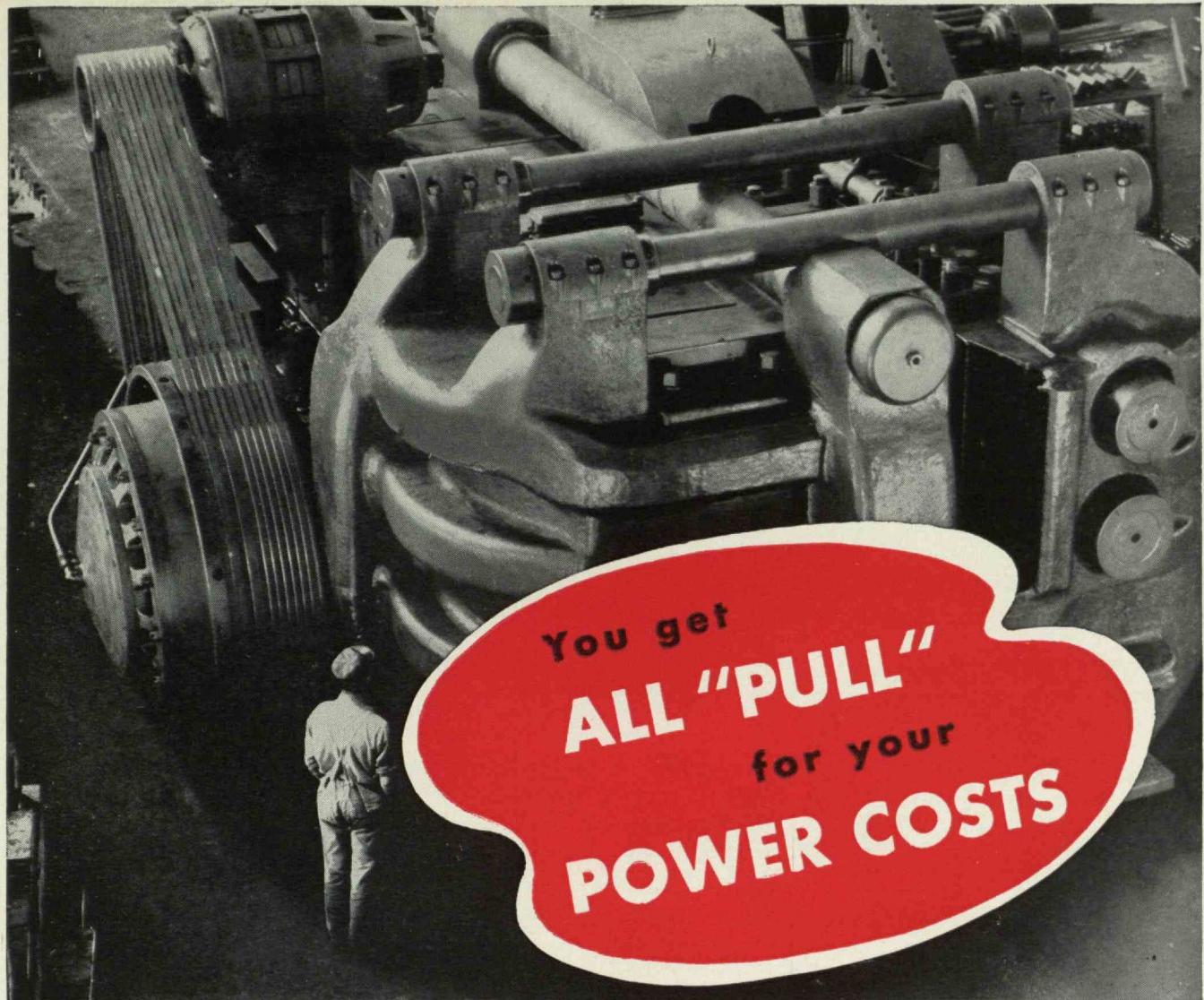
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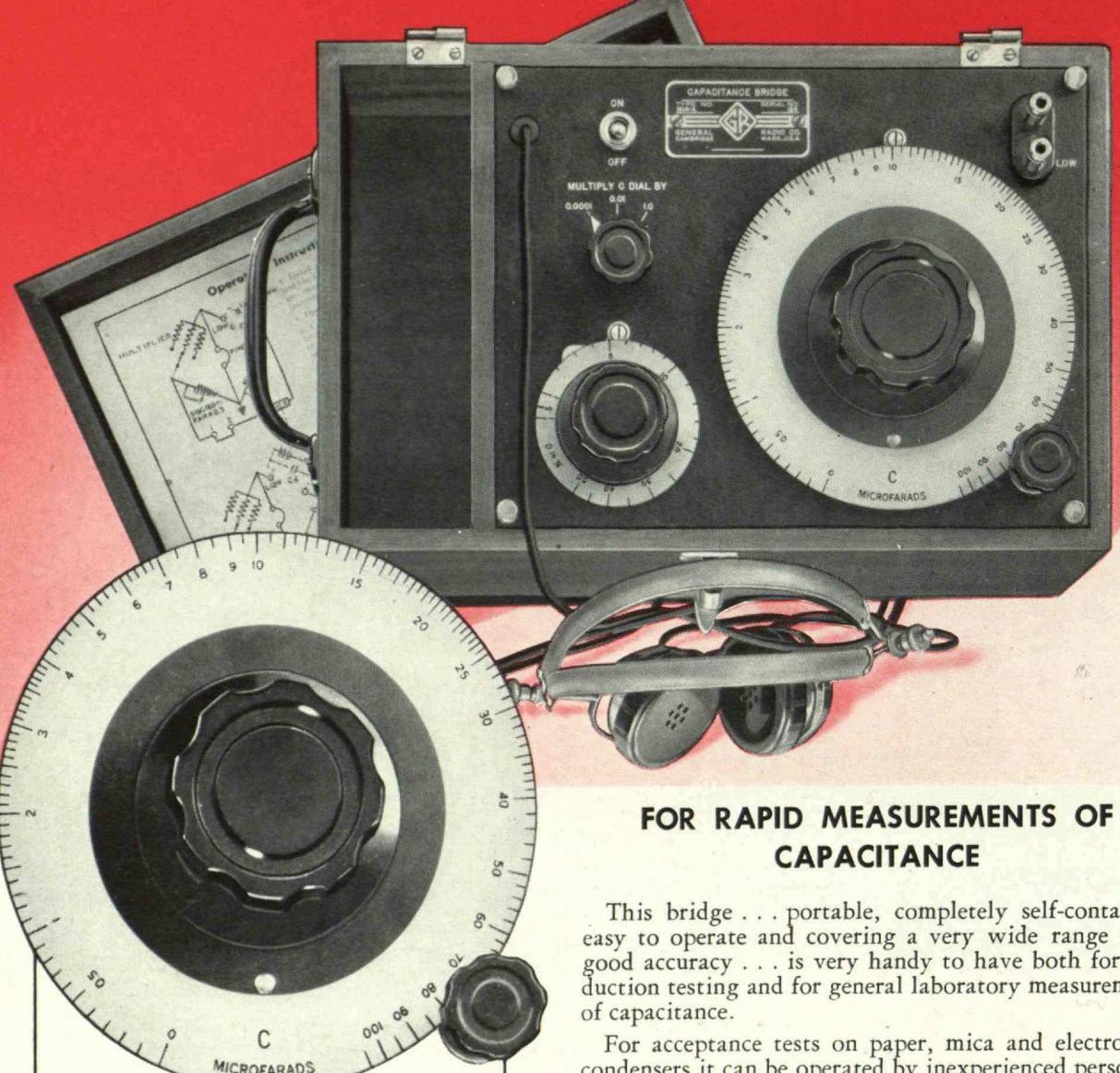
Wilder E. Perkins, '25

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